ARCHIVES OF OPHTHALMOLOGY.

ON THE DEVELOPMENT AND EXTENSION OF ORBITAL SARCOMA.

By Dr. WARD A. HOLDEN.

(*With six figures on a plate.*)

THE frequency with which sarcoma of the orbit recurs, even after apparently thorough removal, and though the tumor be encapsulated, has led me to examine three specimens of recurrent sarcoma with particular reference to the manner of extension. These three cases exhibit fairly well the different starting-points which these growths may have: one springing from the periosteum, and being for the most part fibrous; another having its origin in the cellular tissue of the orbit, and being composed almost entirely of small cells; and the third arising in the choroid and extending back through the optic nerve, forming cellular foci in the dural sheath of the nerve and elsewhere in the orbit.

In all these cases the cells of the younger, developing, portions of the tumor, the sarcoma cells in the infiltrated tissues, and the sarcomatous foci at a distance from the main growth could, for the most part, be traced to the proliferation of the adventitial or the endothelial cells of vessels which were continuous with those of the mass of the tumor.

Case 1 was under the care of Dr. John Dunn, of Richmond, to whom I am indebted for the following history and the tumor removed at the second operation.

Mary O., æt. twelve, employed in a cotton factory, was first seen May 1, 1892. In the previous nine months the left eye had been so swollen at times that it could not be opened. There was no clear history of injury.

St. Pr.—The left eye protrudes 7 *mm*, and its mobility is limited

in every direction, and particularly downward. A growth about 6 *mm* in diameter may be felt resting on the inferior orbital wall, and extending back into the orbit. It is hard, adherent to the orbital wall, and not sensitive to pressure.

May 16, 1892.—The outer canthus was cut through and a vertical incision made 20 *mm* down the cheek. The flap so made was retracted and the tumor dissected out. The growth reached back to the sphenoidal fissure and was adherent to the periosteum and the external rectus. It was tough and seemed to have a firm capsule. It measured 15 *mm* by 4 *mm*.

The tumor was examined by Dr. W. M. Gray, of the Army Medical Museum, who made the following report:

"Miliary tuberculosis. The specimen is composed of bands of dense fibrous connective tissue; between the fibrous bands is a dense lymphoid infiltrate, while throughout the tissue are numerous aggregations of these cells, forming nearly typical miliary tubercles. These cell aggregations differ from miliary tubercles in not containing giant cells. The tissue contains giant cells, however, but they are only found far removed from the tubercles among the cells infiltrating the fibres. Repeated attempts at staining failed to demonstrate tubercle bacilli in the tissues."

Seven months later a tumor could be felt beneath the external portion of the superior wall of the orbit.

March 2, 1893. This growth was removed in several fragments without enucleating the eye. It was similar to the first growth, and adherent to the periosteum. With it were removed the lachrymal gland and a portion of the external rectus muscle.

Microscopic examination of second tumor: The tumor is a fibro-sarcoma, involving the muscle and the lachrymal gland, and in some portions the structure is that of endothelioma. The tumor first removed must be considered sarcomatous. The diagnosis of sarcoma in its Protean forms, is often difficult. Truc (*Nouveau Montpellier Médical*, July 30, 1892) has described a case of sarcoma of the orbit, the histological structure of which led to the erroneous diagnosis of tubercle.

The basis of the second tumor is a dense, laminated fibrous tissue. Some portions are almost entirely free from cellular elements, excepting the nuclei among the fibres.

Other portions contain a considerable number of cells in groups and tracts.

These cells are for the most part rather similar in size and appearance to formative cells, but the groups and tracts are of varying form and size, thus lending a different aspect to different portions of the tumor. The arrangement of the cells, however, is constant and exceedingly characteristic. They form sheaths about blood-vessels of different sizes. The long axis of the cell lies mostly parallel to the axis of the blood-vessel. In parts in which a vessel has been cut longitudinally we find in the fibrous tissue a tract of spindle cells, of varying width, about the vessel. In parts in which a vessel has been cut transversely we find a more or less circular group of cells each round in outline, about the vessel; and where there are several vessels near together the groups of cells are often confluent, constituting a large mass about which the fibrous tissue of the part forms a capsule separating it from others and giving an alveolar appearance to the tumor.

About many vessels in the tumor there is a leucocytic infiltration, these cells often lying near or among the sarcoma cells.

In portions of the tumor some of the transversely cut vessels show about them circular sheaths of cells, while other vessels in the neighborhood are surrounded, not by cells, but by concentrically laminated fibrous tissue. (Fig. 1.) There is no uniformity about these groups. One will be entirely cellular, its neighbor partly cellular, partly fibrous, and the next altogether fibrous with a few spindle-shaped nuclei.

In the portions of the tumor already described the inner coats of the vessels are normal and the new cells have their origin in the proliferation of the adventitial cells. Near the lachrymal gland, however, we find systems of layers of endothelial cells arranged about an empty lumen. (Fig. 2.) The cells have an oval nucleus, the long axis being in a radiating direction from the lumen. It is not possible to say from the appearance whether these cells have arisen from blood-vessels or from lymphatics. Near the lachrymal

gland and in its septa are some large vessels with proliferated endothelium blocking the lumen, and having a thickened and almost homogeneous media. (Fig. 3.)

CASE 2.—*History:* Edna O., æt. seven, was seen by Dr. C. E. Rider of Rochester, in May, 1890. Four years before she had fallen and cut the right eyebrow, but there was no history of more recent injury. Two months before, the parents noticed that the right eye was prominent. *St. Pr.*—The right eye is displaced slightly downward, outward, and forward. Mobility unimpaired. A non-adherent tumor may be felt in the upper and inner portion of the orbit.

May 23, 1890.—Dr. Rider removed the tumor. It was nearly spherical, about ½ inch in diameter, lying loose in the cellular tissue of the orbit and not adherent to the periosteum or the muscles. (The tumor proved to be a small-celled sarcoma with a complete thin fibrous capsule.) Six months later a recurrence was noticed. Dec. 29, 1890, a larger tumor and some extra nodules were removed by Dr. Rider. The growth soon recurred and on Feb. 2, 1891, on Dr. Rider's suggestion and with his assistance, an exenteration of the orbit was done by Dr. Knapp. The eye was enucleated, a large lobular tumor involving the muscles was extirpated, and the entire orbital contents removed. Three months later the growth recurred. Growing to a great size it protruded from the orbit and gave rise to frequent hemorrhages. Later it sloughed off and the patient died Aug. 21, 1891.

Microscopic.—The tumor last removed is composed mostly of dense masses of small sarcoma cells. In some portions it shows a myxomatous structure and in other portions are accumulations of giant cells. The muscles are extensively involved and many muscle bundles are atrophied. In one part the tumor has a thick fibrous capsule which is pervaded with capillaries having sarcoma cells about them (Figs. 4 and 5), and the tissues outside the capsule are infiltrated with sarcoma cells.

CASE 3.—L., a man of fifty-six, was seen by Dr. Knapp, February 12, 1892. A year before, detachment of the retina in the left

eye had been diagnosed. Six weeks previously the eye had been enucleated on account of irritation. Prof. Prudden, to whom the enucleated eye had been sent, found a melano-sarcoma of the choroid extending down the optic nerve to its cut end.

When seen six weeks after the enucleation there was a little fulness of the orbit, and exenteration was done by Dr. Knapp.

Microscopic.—In the mass composing the orbital contents, three hard nodules were found. One of these proved to be a bit of the optic nerve which had apparently been cut off at the time of enucleation in the effort to divide the nerve far back. The remainder of the nerve was not found.

The bit consisted of a portion of the optic nerve with its sheaths 3 *mm* long. The nerve fibres are atrophied and the connective-tissue septa filled with pigmented and unpigmented sarcoma cells. The pial sheath is not involved, and the intervaginal space is free except at the point where the central vessels pass from the nerve through the dural sheath. Here a continuous mass of spindle cells unites the nerve and the dural sheath. Running in the dural sheath are a great number of small vessels and capillaries with proliferating walls. Here and there are groups of unpigmented sarcoma cells, and at many points dense leucocytic infiltrations. The fatty tissue on the outer surface of the dural sheath shows a beginning sarcomatous infiltration.

The two other nodules are composed of dense fibrous tissue with a sarcomatous infiltration similar to that in the dural sheath.

Remarks.

The fibrous tissue in the substance of a sarcoma, or forming its capsule or sheath, may have three sources of origin. 1st. It may be simply the previously existing tissue of the part, changed in its relations by the development of the sarcoma cells. 2d. It may be new tissue formed in the usual way by the proliferation of connective-tissue cells, or formative cells, as in ordinary hyperplasia, or in fibroma. 3d. It may be developed by the proliferation of the adventitial cells of vessels, as is shown in Fig. 1.

The fibrous tissue in sarcoma is not important, and our interest centres in the cell development, whether this takes place in new-formed connective tissue, or in that previously existing. This cell development may be considered as it takes place in simple fibrous tissue, and also as it takes place in the modified forms of connective tissue making up the framework of muscle, fat, and acinous gland.

Many sarcomas still show in their older portions evidences of each tract of parallel spindle or of round cells having been developed from the adventitial cells of a vessel. In each of the three cases here described this is more or less clear in the denser portions of the tumor, but it may be particularly well seen in portions in which fibrous tissue is undergoing what is called sarcomatous infiltration. In the thick fibrous capsule limiting a portion of the tumor in Case 2, we find a great number of branching small vessels and capillaries. Here and there about these vessels are irregular groups of spindle cells, the long axis parallel to the axis of the vessel, and the cells evidently developed from the adventitial cells of the vessel. Fig. 4 shows such vessels cut transversely, and Fig. 5 such cut longitudinally. Having passed through the capsule the vessels run into fatty tissue, and here also we find groups of spindle cells.

In the dural sheath of the optic nerve and in the other dense fibrous nodules in Case 3, we find a similar condition. A number of small vessels and capillaries, often apparently of new formation, have groups of spindle cells about them. A vessel may have almost normal walls for a considerable distance, and then a group of sarcoma cells be found far from any other group and far from the mass of the tumor.

When a sarcoma of the ciliary body passes through the sclera following the small vessels of the sclero-corneal junction, we do not have simply a proliferation of sarcoma cells following the path of a vessel, but the specific irritation that produces sarcoma, whatever it may be, causes a proliferation of the adventitial cells of the vessels themselves. This proliferation may vary in degree in different portions of the vessel, and is often most excessive at some remote point,

being usually slight in the dense scleral tissue and more marked in the looser subconjunctival tissue.

Although the sarcoma cells themselves may and do divide, as is shown by the presence of multinuclear cells, yet the cells are rarely found at any considerable distance from some vessel, and each tract of cells is of limited lateral extent, apparently indicating that for the most part the cells are produced by proliferation of the cells of the vessel wall, the older cells being pushed farther from the vessel by the development of new cells beneath them, the vessel finally often being compressed or entirely obliterated and the process ceasing for that particular tract.

In adipose tissue, when it is beginning to be infiltrated, we find vessels with sarcoma cells about them lying in the fibrous tissue bordering the adipose. (Fig. 6.) These vessels run out into the delicate fibrous tissue between the fat masses and break up into a delicate meshwork of capillaries. The individual vessels on account of the structure of the tissue can only be followed a short distance. Nevertheless, the sarcoma cells that invade the connective-tissue reticulum may here also be seen often to lie about the wall of larger vessels. As the development proceeds, the entire connective-tissue meshwork is filled with sarcoma cells while the fat spaces remain free.

In muscle the external perimysium forms a barrier for a time to the extension of the sarcoma, and often the growth will surround the muscle completely before entering it. At length we find a few vessels with sarcomatous sheaths in the connective-tissue septa. Then the sarcoma cells in dense masses push in from some point in the periphery between the smaller groups of muscle bundles, and finally fill the entire connective-tissue framework of the muscle, separating the muscle bundles and eventually causing them to atrophy. In this process it is often difficult or impossible to trace the origin of the sarcoma cells, though in some instances they may be clearly traced to the vessels.

The lachrymal gland in Case I is normal in its periphery. In the septa in its interior most of the larger vessels show a proliferation of the endothelium, so that the lumen is often

obliterated, and also show a thickened homogeneous media (Fig. 3). Some of the smaller vessels show a leucocytic infiltration about them, and at some points a few sarcoma cells. The glandular tissue proper is unaffected.

In recapitulation we may say in so far as the conditions found in three cases may be generalized, that sarcoma of the orbit develops mostly from the proliferation of the adventitial cells and more rarely of the endothelial cells of vessels; that there may be but a slight proliferation about a vessel for a distance from the main tumor, and then at some point a large focus; and that even dense connective-tissue membranes and capsules offer little resistance to the extension of sarcoma when the vessels of the tumor are continuous with those of the membrane.

Description of the Figures.

FIG. 1.—Transversely cut vessels, one with sarcoma cells about it, others surrounded by new fibrous tissue.

FIG. 2.—Proliferated endothelium about an empty branched lumen.

FIG. 3.—A vessel with proliferated endothelium and degenerating media in a septum of the lachrymal gland.

FIGS. 4 and 5.—A laminated fibrous capsule of a sarcoma, with proliferating capillaries—cut longitudinally in Fig. 4, and transversely in Fig. 5.

FIG. 6.—Beginning sarcomatous infiltration of adipose tissue.

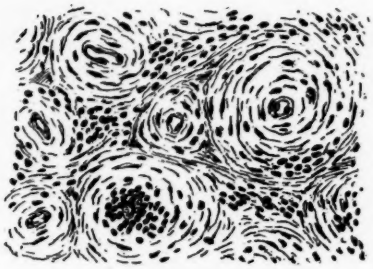


FIG. 1, CASE I.

FIG. 4, CASE II.

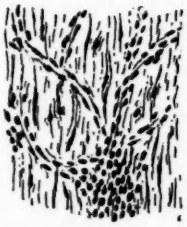


FIG. 5, CASE II.

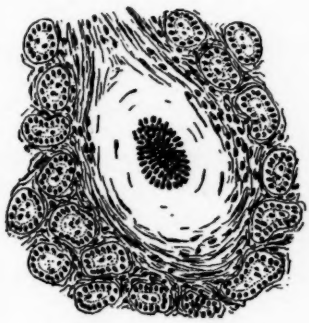


FIG. 3, CASE I.

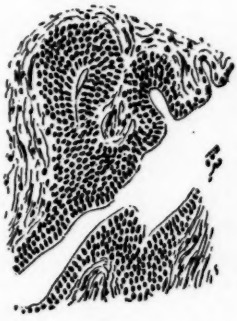


FIG. 2, CASE I.

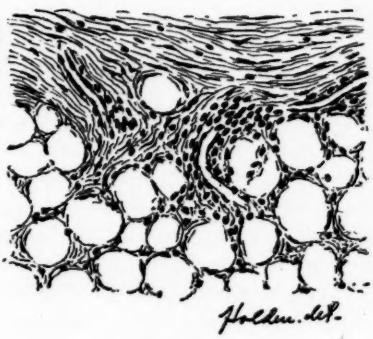


FIG. 6, CASE III.

BACTERIOLOGICAL INVESTIGATIONS WITH REFERENCE TO THE ORIGIN OF SYMPATHETIC OPHTHALMIA.

By Dr. RICHARD GREEFF, of Frankfort-on-the-Main.

Translated by Dr. Robert L. Randolph, of Baltimore, Md.

(*With three figures in the text.*)

THE fact that a traumatic inflammation of one eye can pass over to the fellow eye has been known for a long time. But in spite of numerous observations and experiments we are to-day far from clear as to the exact nature of this inflammation and what track it follows in going from one eye to the other. In fact, we often do not know whether we have to deal with a sympathetically affected eye, or whether the inflammation in the second eye has any connection with the inflammation in the injured eye. Schweigger (*Bericht der Ophthal. Gesellschaft*, 1891, S. 109) recognizes no clinical picture as peculiar to this disease. Until recently he had looked upon the condition when the iris was almost completely adherent posteriorly, and when there was growth and proliferation of connective tissue in the uveal tract with deposits on Descemet's membrane, as characteristic of sympathetic ophthalmia, but he reports two cases where he found identically the same condition as is here described, and where there was no history of injury. Schweigger says the disease may show itself from two to four weeks after the injury. Schmidt-Rimpler makes the earliest limit from four to eight weeks, exceptionally two weeks. Sometimes the disease does not appear

for twenty years. Cases have been reported where sympathetic ophthalmia developed in two days (!). It is evident that these different opinions render the factor of time of little or no help to us in establishing a diagnosis. Schirmer has collected statistics which go to show that the diagnosis sympathetic ophthalmia could not stand criticism in twenty-seven cases out of thirty, where the primary trouble was an intra-ocular tumor and where there was no perforation of the eyeball. I would like to lay especial stress upon the uncertainty of establishing a diagnosis when it comes to setting a value upon isolated cases which appear to contradict a whole series of observations. Separate and distinct positive or negative conditions, whether of a clinical or of pathologico-anatomical nature, ought not then to be too sharply emphasized. And this is especially true, 1st, when theories are advanced based upon isolated positive results and regarded thereby as proven; time has already shown us how far in this respect we can go wrong. 2d. In reviewing the operations which are performed nowadays for the treatment or rather the prophylaxis of sympathetic ophthalmia, there are to be met with many observations, and that too from widely different sources, which cast a doubt upon the certainty of almost every operation.

We cannot estimate the value of our method of operation, simply from one case, and just as little can we speak of our method of operation as being the right one. It is clear that we can cut short this migratory inflammation only if we know the track which it follows. There was a time when the problem of the pathogenesis of sympathetic ophthalmia seemed answered by Deutschmann's investigations, but during the past few years his work has met with so many objections in Germany, France, England, and America that a doubt as to the value of his results can no longer be overcome. Two years ago I undertook to verify Deutschmann's work, not doubting that with all the advantages of bacteriology at my disposal I should succeed in proving the parasitic origin of sympathetic ophthalmia. I had at my disposal the extensive material to be found in the clinic of Profs. Schweigger and enjoyed the valuable co-operation of the bacteriolo-

gists Pfeiffer and Frosch. To these gentlemen I am under many obligations. My earlier bacteriological investigations were carried on in Koch's Institute, and the others in the laboratory of the University Eye Clinic in Berlin. Time has seen many changes in the views expressed as to the pathogenesis of sympathetic ophthalmia. William Mackenzie in 1844 first described it and suggested three possible ways, any of which the inflammation might follow. 1st. The disease can pass from the blood-vessels of one eye to those of the fellow eye at the point of communication within the brain. 2d. Through the ciliary nerves. 3d. The disease can make its way from the retina of the injured eye along the optic nerve to the chiasm and here set up a condition of irritation, which can communicate itself to the retina of the other eye. Mackenzie thought, however, that the optic nerve was the most usual route followed by the disease. This ended the first period. The second period is represented by the ciliary-nerve theory of Heinrich Müller, which theory prevailed generally up to 1881, and this year marked the beginning of the third period, and is noteworthy as being the year when Snellen, Berlin, and Leber advanced the opinion that sympathetic ophthalmia was of microbic origin. One could also distinguish a fourth period, since observations have multiplied which contradict those of Deutschmann, if only something definite and positive were established. Of this fourth period Schmidt-Rimpler is the foremost representative. He brings forward a modified ciliary-nerve theory and is of the opinion that the disturbances of nutrition and in the circulation brought on by the irritation of the ciliary nerves in the injured eye are alone responsible for the sympathetic inflammation of the other eye. The longer these changes exist and the more extensive they are, so much the more suitable is the soil rendered for the action of the injurious agents whatever they are, whether of chemical or microbic nature.

It is well known that a collective investigation on sympathetic ophthalmia has been made by a committee of the English Ophthalmological Society, Mr. Nettleship being

secretary. Two hundred and eleven cases were collected, which appeared in two groups.

1st. The primary symptom being papillitis, usually accompanied by opacities of the vitreous.

2d. Under the picture of uvëitis.

Papillitis occurred in about 10 per cent. of the cases as the first symptom, in half the number soon followed by uvëitis, remaining confined to the optic disc and vitreous in the other half. Doubt about the sympathetic nature of the latter may well be entertained.

Before describing my methods of investigation I shall call attention to a few points. (1) In a large series of investigations it is not sufficient to make sections alone, and even when made by a careful and practised hand, a negative result should not be regarded as absolutely convincing proof. (2) Anaërobic cultures have never been suggested. (3) One has generally experimented with and directed attention to the culture media of the pus organisms without considering that sympathetic ophthalmia seldom makes its appearance after suppuration, and that the disease is practically never seen in connection with panophthalmitis, but, on the contrary, shows itself under the garb of a seroplastic inflammation. It seems expedient then to resort to other culture methods, or if one distrusts the suitability of the present culture media for all kinds of microbes, the surest and simplest way would be the inoculation of the anterior chamber of a rabbit with a piece of the diseased optic nerve. (4) Injuries which lead to sluggish (schleichende) irido-choroiditis and blindness are probably associated with the presence of bacteria. Another question is whether the bacteria have gotten into the optic nerve or its sheaths, and hence it is of greater importance to ascertain whether the organisms are present in the optic nerve of the injured eye than in the eye itself, for it is quite possible to find organisms in the eyeball and none in the optic nerve behind the lamina cribrosa. (5) And after inoculating one eye and causing inflammation in the fellow eye and finding organisms in the latter, it should be ascertained whether this secondary inflammation

is not due to a general infection. Hence the importance of examining the blood and other organs.

Cases where a general infection has occurred should be excluded.

The three following cases came under my observation and were examined with every bacteriological precaution.

Case 1.—Wounded in right eye with a knife on June 16, 1890, and when seen had a perforating wound of cornea, wound of lens, and small particles of lens substance in anterior chamber, wound and incarceration of iris, intra-ocular hemorrhage. Light perception. June 25th, sluggish irido-choroiditis. Ten months after this, sympathetic ophthalmia showed itself in the left eye. A few days later resection of the optic nerve was performed and a small piece of nerve was put into a tube for bacteriological examination. I may add that before using the instruments they were rinsed out in pure boiling water so that no sublimate or carbolic acid came in contact with the nerve. Bacteriological examination:

(a) The piece of optic nerve was divided and a portion was put into bouillon.

(b) The other half was put in glycerine agar-agar, and two attenuations were made from this and poured into saucers and kept at blood heat.

(c) A small particle of the nerve was inserted into the anterior chamber of a rabbit.

(d) The remainder was put into absolute alcohol.

The plate cultures and bouillon remained sterile, and six weeks later the media of the rabbit's eye were clear, the piece of optic nerve was still to be seen.

The same systematic examination was gone through with in two other cases where sympathetic ophthalmia had developed, and notwithstanding the most careful bacteriological examinations, according to the various methods, no organisms were found.

Similar results are reported by Nordenson, Ayres, Alt, Berry, Schmidt-Rimpler, Trousseau, Poncet, and Uhthoff. In opposition to all these observers Deutschmann brings forward a record which embodies the bacteriological examination of seventeen eyes which had caused sympathetic ophthalmia, and in every eye but one organisms were found,

and as regards this (one) negative result, he says: "It proves that no organisms were found in my sections, and does not prove that there were no organisms anywhere present in the eyeball." In the majority of the cases these micro-organisms were found also in the optic nerve and its sheaths. Wagenmann demonstrated the presence of organisms in two eyes which had given rise to sympathetic ophthalmia. At present then we are justified in this conclusion: Proof does exist that micro-organisms were present in eyes which had given rise to sympathetic ophthalmia. This fact however has never been verified by most investigators, and hence in these latter cases sympathetic ophthalmia occurred without the presence of organisms, and we cannot conclude, therefore, that in those cases where organisms were found that they were the causal agents. Experience teaches us that sometimes a considerable period elapses between the injury and the outbreak of the sympathetic inflammation. In these cases one would suppose that the micro-organisms in the optic nerve of the injured eye would have perished long before the appearance of the disease in the second eye. In order to decide this question I have examined the ends of optic nerves where neurectomy was made for fear of sympathetic disease. My investigations cover fourteen cases, and the period between the injury and the resection of the nerve ranged from three weeks to three months. In every case the operation was resorted to for fear of an outbreak of sympathetic ophthalmia. It was highly probable that septic material entered the eyeball at the time of the injury. Cultures were made on all the varieties of culture media, sometimes pieces were hardened in alcohol, stained after Gram's and Weigert's methods and examined microscopically, and in not a single instance were organisms found in either the optic nerve or its sheaths. I do not mean to say that in all these cases no colonies showed themselves on the plates, for an occasional impurity easily occurs in bacteriological work, but this is recognized by a practised eye. It can be asserted, however, with absolute certainty that in not a single instance did I observe anything which could be said to correspond to what Deutschmann describes and which is

supposed to represent the typical case. When he says that one positive result proves more than many negative ones, I take issue with him. The very fact that mistakes and contaminations so easily occur in this kind of work leads one to believe the very opposite of this assertion. One positive result proves nothing in bacteriological work, and it is only when a positive result can be repeatedly obtained that any value can be set upon it. My examinations of resected optic nerves is a continuation and completion of Ohlemann's work. The latter made thirty such examinations, and in every case with a negative result, though especial attention was directed in the various sections to the spaces between the sheaths of the nerve. Randolph examined three eyes which had been enucleated for fear of sympathetic ophthalmia, and in all three the injury resulted from the entrance of a foreign body, and in no case were organisms found, though an exhaustive bacteriological examination was made (Knapp und Schweigger's ARCHIV FÜR AUGENHEILK., Bd. xxi., S. 176). Pflüger made a similar examination in more than a dozen cases, and with a like result (*Bericht der ophthal. Gesellschaft*, 1891, S. 103, Discussion). Deutschmann found organisms in almost every case. Limbourg and Levy found in several eyes a coccus corresponding to one described by Sattler, but experiments with this organism failed to produce sympathetic ophthalmia, and in the majority of eyes examined no organisms were found. All these facts recall to our minds what Koch has declared to be essential for bacterial infection. 1. The organisms ought to be demonstrable in all cases of the disease, and it is self-evident that the organism cannot be the specific one if the disease can occur without it. 2. The organism ought to be found in this disease and in no other. 3. The organism should be found in the tissues in such numbers and under such conditions as to explain the clinical symptoms. 4. It ought to be possible to cultivate such an organism and produce the disease experimentally.

I shall here report the following case of sympathetic irritation which is especially interesting on account of the physiology of the field of vision.

P. Grammann, sailor. Wounded in left eye on May 24, 1891, with a piece of steel. Nothing was removed from the eye. He was obliged to lie in bed with both eyes bound up for twenty days, using leeches and atropia. Immediately after the injury was conscious of a pricking sensation in the region of the forehead, and in ten days later the same sensation was felt in the eye itself. The bandage was removed from the right eye on the twentieth day.

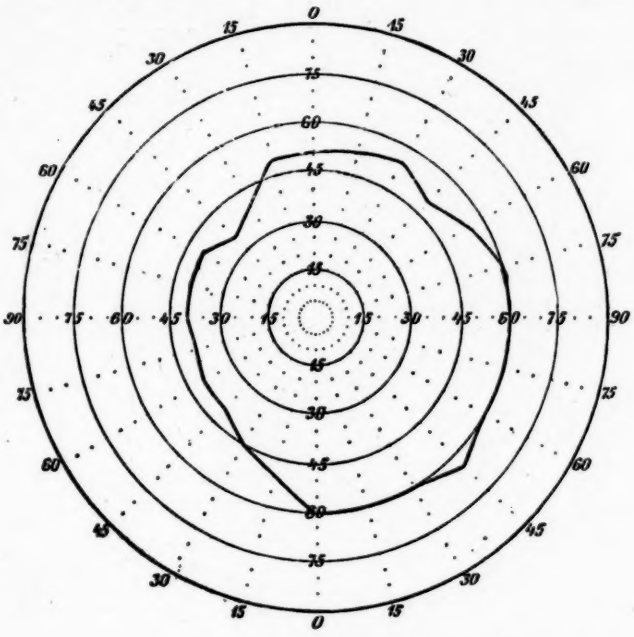


FIG. 1.—Visual field of Right eye with Left open.
S = $\frac{6}{6}$; 0.3 in 20 *cm*.

He could see nothing out of the left eye. At this time the right eye began to water very frequently, and soon became tired and painful and unfit for use. He noticed that when he held his injured eye shut that he saw better with the other eye. *Status:* L. E., unirritable; corneal wound with incarceration of iris. Cataract. V = movements of hand at 1 *m*. Projection uncertain except outwards. R. E., binocularly V = $\frac{6}{6}$, and when left eye was closed,

V = $\frac{1}{6}$, and when the left eye was closed the field of vision in the right eye became wider.

Schweigger has observed this condition several times, but there was always present some vision in the injured eye. Resection of the optic nerve was performed, and portions of

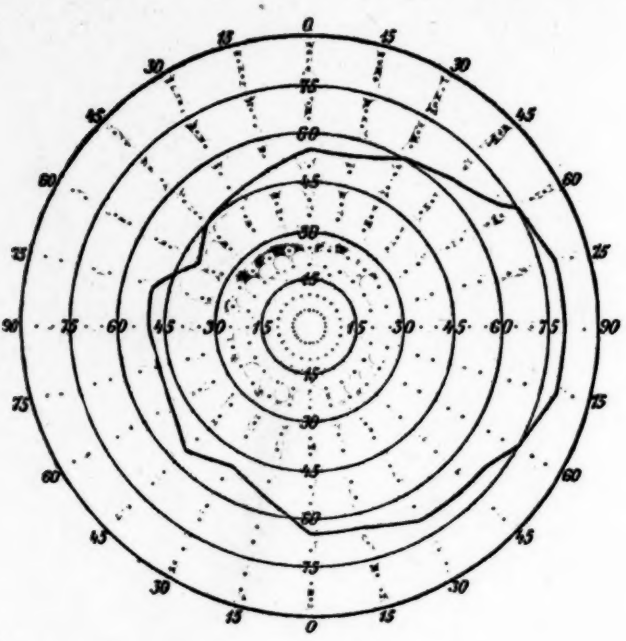


FIG. 2.—Visual field of Right eye with Left closed.

S = $\frac{1}{6}$; 0.3 in 30—20 *cm.*

the nerve were stained with Weigert's, Gram's, and Löffler's methods, but no organisms were discovered.

Kuhnt reports a bacteriological examination of an eye in which sympathetic disease existed, and which had just been enucleated. Inoculations were made from the aqueous, iris, vitreous, and optic nerve upon the different culture media, but with negative results (*Bericht der ophthal. Gesellschaft*,

Heidelberg, 1891). Schanz observed a fresh case of sympathetic ophthalmia. After washing out the conjunctival sac of the injured eye, the anterior chamber was opened and the aqueous was drawn up into a pipette, and this with a portion of the iris which was cut off, was inoculated upon various culture media. The result was abso-

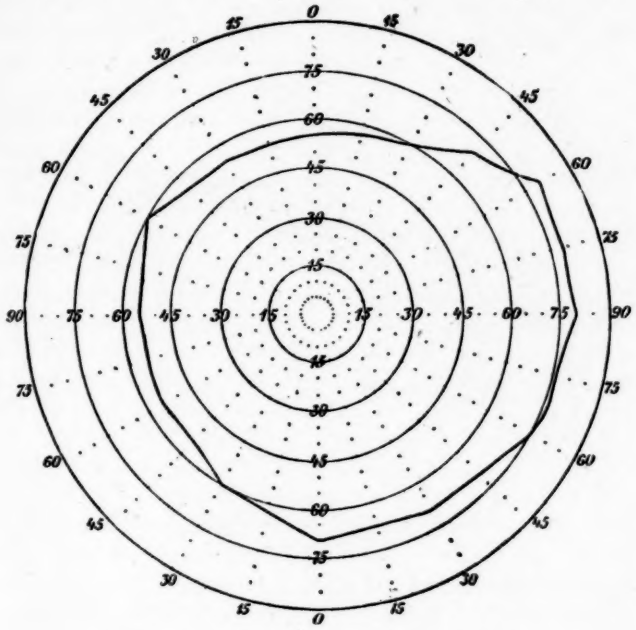


FIG. 3.—Visual field of Right eye after resection of Left.
S = $\frac{1}{6}$; 0.3 in 30—18 *cm.*

lutely negative. As to the experiments on animals. The work of Deutschmann is of course well known. In his experiments he used first the spores of the aspergillus fumigatus, and injected an infusion of this organism into the vitreous or optic nerve of a rabbit, and a few days later he observed optic neuritis and progressive inflammation of the uveal tract. He regards the optic nerve and its sheaths as

the track followed by the organisms. These experiments were repeated with the pus organism and with similar results. Deutschmann's work has been repeated by Alt, Gifford, Mazza, Randolph, Ulrich, Limbourg, Levy, and myself. After injecting a putrid solution into an eye, panophthalmitis was observed by Alt, but no symptom of sympathetic trouble. On saturating a thread in croton oil and drawing it through the optic nerve he observed eight days later neuritis optica in the other eye, which soon disappeared. The injection of an infusion of abrus precatoria (Jequiriti, Bush) was followed in several instances by ophthalmoscopic changes in the other eye, and by the speedy death of the animal (*Amer. Jour. Ophthal.*, July 15, 1884). Gifford was unable to produce any change whatever in the second eye after repeating the experiments of Deutschmann with the pus organism. When he employed the anthrax bacillus, he found in three cases that this organism was present in the second eye (Knapp und Schweigger's ARCHIV FÜR AUGENHEILKUNDE Bd. xvii. S. 14). The great objection to the use of the anthrax bacillus is the rapidity with which general infection follows, and hence one would naturally look for the appearance of the organism in the papilla and uveal tract of the second eye. Randolph has also called attention to this fact. Mazza in experimenting on rabbits and guinea-pigs never observed the migration of staphylococci from one eye to the other, nor did he ever observe any changes with the ophthalmoscope. In those cases where the micrococci were found in the sheaths and trunk of the nerve, the animals had died of meningitis. He concludes that it is impossible to produce sympathetic ophthalmia experimentally with the pus organism (*Bericht des inter. ophthal. Congresses*, 1888, S. 417).

Randolph experimented on eighteen dogs. He used these animals because he thought that they would not be likely to succumb to a general infection. In no case did he detect ophthalmoscopic changes in the fundus of the second eye. The same results he obtained after inoculating eighteen rabbits (These ARCHIVES, vol. xvii., p. 188, and ARCHIV FÜR AUGENHEILK., Bd. xxi, S. 159). Ulrich's experiments on

rabbits resulted just as did Randolph's (*Bericht der ophthal. Gesellschaft*, 1891, S. 109). Limbourg and Levy experimented on forty-two animals, mostly rabbits, and their results were all negative (*Archiv für Experimen. Pathologie und Pharmak.*, Bd. xxviii, 1 und 2).

In the few experiments of my own, which I shall add to the above, I have laid especial stress upon this point, namely, whether the organisms wandered into the optic nerve and its sheaths, and whether these same organisms were found elsewhere in the body, in other words, whether a general infection was present. Experiments of this character followed by general infection are to be condemned as evidence in favor of Deutschmann's theory. For the changes in the second eye are to be attributed to the presence of organisms throughout the entire circulation of the body, and not to the fact that the organisms have selected the optic nerve as their route to the other eye. Experiments on rabbits where inoculations are made in other parts of the body often give rise to eye disease. Ed. Meyer was asked to look at a supposed case of sympathetic ophthalmia which had been produced experimentally in a rabbit. He found an almost typical condition in both eyes, but on looking at other rabbits in the same laboratory he observed exactly the same symptoms, although these latter had been used for an entirely different character of experiments, where the inoculations had been made in parts of the body remote from the eye (*Bericht der oph. Gesellschaft*, 1891, S. 104). We know that sympathetic ophthalmia in man is never attended with general infection. And under this head I may mention the case described by Gayet, who claims to have produced sympathetic ophthalmia by introducing into the anterior chamber of a rabbit a piece of a tumor taken from the lachrymal sac. The inoculated eye became blind, and fourteen days later the other eye inflamed and took on a violent keratitis. Such a picture does not correspond to that of sympathetic ophthalmia, and Gayet's assumption that this was sympathetic ophthalmia is open to grave doubt. Such forms of keratitis are often the expressions of a general disease, and unless it could be clearly demonstrated

that the rabbit was otherwise sound it can not be regarded as an undoubted case of sympathetic ophthalmia.

Injected a putrid solution into the vitreous of three rabbits and panophthalmitis resulted at once with rupture of the ball. No changes were visible in the second eye. A few weeks later the ball was enucleated and, together with a small portion of the nerve, was examined for organisms. None were found and this was to be expected, for were pus cocci in the habit of migrating into the optic nerve and its sheaths, retrobulbar abscesses or inflammations would often occur in panophthalmitis. The aspergillus fumigatus was injected into the vitreous of four rabbits. On the first day the changes described by Leber were observed. In two cases I observed a slight haziness of the fundus with tortuosity of the vessels and redness of the papilla, but these appearances were gone in two or three days. These were the changes already described by Randolph, and which the latter has ascribed not to the presence of organisms but to a reflex overfilling of the vessels caused by the inflammation going on in the inoculated eye. I injected an emulsion of the staphylococcus pyog. aureus into the right eye of seven rabbits, and after a certain length of time an examination was made of the end of the optic nerve of the right eye and also of the left eye. The blood from several of the organs was also examined. One of the rabbits died of meningitis, two others wasted away and four lived. An examination in the first three cases revealed inflammatory changes in the second eye, and organisms were found in the end of the optic nerve and also in other organs of the body. Of the other four rabbits which lived, one showed slight changes in the second eye, but no organisms were found in any of these cases. The fact could not be established that a direct migration of the organisms through the channel of the optic nerve and its sheaths had occurred. And, furthermore, organisms were found in the second eye in those cases only in which organisms were present in other organs of the body, and thus had reached the second eye through the general circulation. These experiments failed then to produce genuine sympathetic ophthalmia without a general infection.

And when I take into consideration all my own investigations and the various literature upon the subject, I have come to the conclusion that Deutschmann's migration theory cannot be regarded as proven, and that it is not proven till sympathetic ophthalmia can be produced experimentally by other investigators and that too over and over again, and until organisms can be demonstrated in the second eye without the co-existence of general infection. And furthermore, it is my opinion that the present methods of bacteriological examination have proven the absence of organisms, in cases where sympathetic disease has broken out and where the eyeball and optic nerves were subjected to an examination.

In looking about in the medical world we see much that is unfinished and unknown, and especially in those things pertaining to bacteriology. Many processes no doubt of parasitic origin remain still unproven. The migration theory is still an hypothesis, just as is the ciliary nerve theory. It has recently been suggested by several ophthalmologists and bacteriologists that possibly the metabolic products of the organisms and not the organisms themselves get into the lymph streams, and passing over to the other eye set up inflammation. Rosenmeyer (X. *Inter. Med. Congress*, Bd. IV., S. 127) and Gorecki (*Société d' Ophtal. de Paris*, Séance du 7 Avril, 1891) have both suggested this solution of the problem. Limbourg and Levy concluded their experiments with the following: Sympathetic ophthalmia ought to be regarded as a lymphangitis, which can be distinguished from lymphangitis in other parts of the body by its complicated anatomical and physiological characteristics. In lymphangitis of the extremities, few cases are to be found as a general thing, and in these cases the cause of the suppuration is undoubtedly of a chemical nature, the toxalbumen. This may be the case with sympathetic ophthalmia, but there exists a great clinical difference between the two. We have febrile manifestations as soon as toxalbumen gets into the lymph or blood currents, and we have no such symptoms in sympathetic ophthalmia, though Pflüger (*Bericht der ophth. Gesellschaft zu Heidelberg*, 1892, Discussion, S. 24) reports

a case of sympathetic ophthalmia with violent headache and fever. This isolated case, however, cannot be regarded as weighty evidence. These clinical symptoms are valueless unless observed in many cases. I made some experiments with a sterilized pyocaneus bouillon culture, which Dr. Schimmelbusch of Berlin kindly placed at my disposal. After injecting moderately large doses into the vitreous of rabbits, the latter died very soon with violent febrile manifestations. Small doses injected into the vitreous brought on fever, suppuration of the vitreous, and a sluggish iridochoroiditis. When the fever abated the inflammatory symptoms disappeared and the eyeballs shrunk up, though the animals remained alive. Of course these few experiments prove nothing. But the absence of fever in a case of sympathetic ophthalmia does not permit us to assume that the metabolic products of the organisms in the lymph or blood currents are carried over directly from one eye to the other, and so cause sympathetic inflammation. Or can such a process occur gradually without any marked elevation of temperature? On anatomo-physiological grounds I cannot reconcile myself with any such theory.

In conclusion I call attention to the work of Schirmer which appeared in the last number of *von Graefe's Archiv*, year 1892. After following in detail, in a long series of experiments, the work of Deutschmann, and after examining, both histologically and bacteriologically, eyes which had given rise to sympathetic ophthalmia, he could find nothing to justify Deutschmann's conclusions. Schirmer, like myself, is inclined to believe in the parasitic origin of sympathetic ophthalmia. I regard rabbits as absolutely useless in this class of experiments, but even if we succeed in obtaining a specimen for examination in the case of the disease in man, the present status of bacteriology will give us no result. *Multum restat adhuc operis, multumque restabit.*

BILATERAL HEMIANOPSIA, WITH AUTOPSY.

By Prof. SCHMIDT-RIMPLER, of Goettingen.

Translated by Dr. J. A. Spalding, Portland, Me.

(*With two figures in the text.*)

FOERSTER,[1] Schweigger,[2] Groenouw,[3] and Vorster[4] have each observed and described a case of this nature, but so far as I can discover none with an autopsy has ever been published. The latter I am now enabled to offer for the first time, though the preliminary observation first appeared in the second edition of my text-book on diseases of the eye.

Georg H., æt. fifty-one, was hit on the head in January, 1873, with a heavy stone, falling from a distance of fifteen feet above him. He became unconscious at once, and remained so for several hours. The scalp wound was sutured, though no bone is reported to have been removed, and in five days he was at work once more. He remained fairly well on the whole till 1875, with occasional pain in the head and vertigo, lasting for a few minutes only. At New Year's Day he first perceived on getting up in the night a weakness in his right leg, and on returning to bed he became unconscious and remained so for twelve hours. In March he began work again despite the slight hemiplegia, but often had to be taken home partly unconscious. A second attack came on at Easter, as he was pulling on his stockings. He

[1] *Graefe's Archiv*, Band xxxvi., p. 94.
[2] These Archives, vol. xxii.
[3] *Archiv für Psych. und Nervenkrankheiten*, Band xxiii., p. 339.
[4] *Allgemeine Zeitschrift für Psychiatrie*, Band xlix., 227.

also became deaf in his right ear, and his attention was called to a defect in the right field of vision, slight at first, then increasing, and in a few days remaining stationary. He was taken into the hospital in May, with pain in the right arm and leg, and the visual fields affected as figured in the accompanying sketches.

There was nothing pathological in the ophthalmoscopic picture of the fundus of either eye, and vision in each eye was normal.

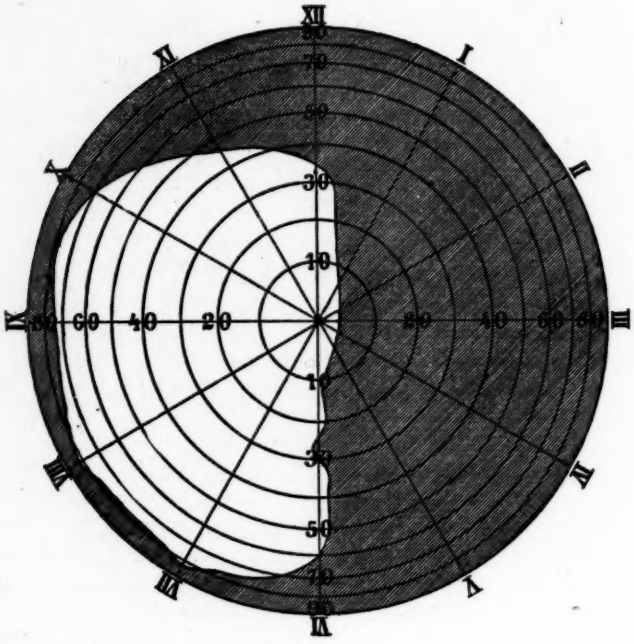


FIG. 1.—Left Eye.

As time proceeded the fields remained about the same, but the deafness in the right ear decreased, as well as the right hemiplegia. The patient's condition remained about the same for many months, and he was again at work in 1876, when in December he suffered more than before from headache, and on the 13th of that month a distinct diminution of the sight, which he attributed to exposure to dampness. A week later he had a

desire to put out the light on going to bed, but found that he could no longer see it, though he had seen it fairly well on the day before. Slight chills from time to time.

The condition on December 21st, when he came into the clinique once more was as follows: Body well nourished. On the right temporal bone a very small hard cicatrix. Mind clear, but answers to questions are slowly given. Memory poor; confuses

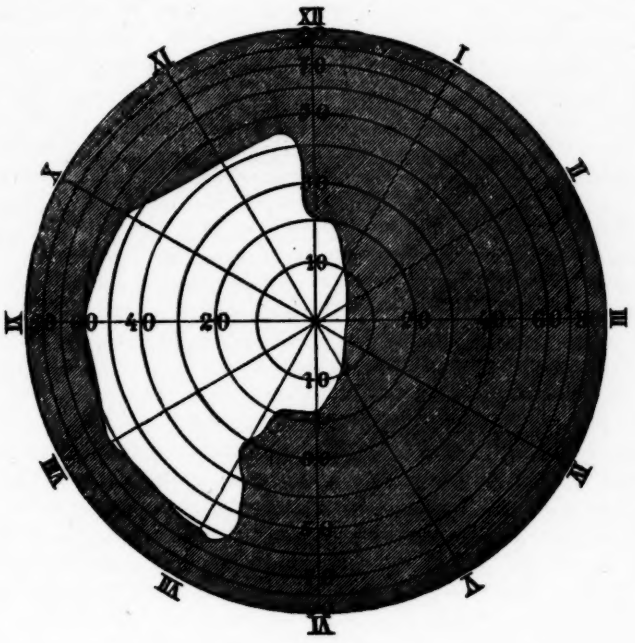


FIG. 2.—Right Eye.

right and left. The headache and vertigo have ceased. Hearing for watch: Right, 18 inches; Left, 2 inches. Tuning-fork and bone-perception tests are confusing to the patient, and his answers incorrect. No facial paralysis, though the tongue when outstretched points a little to the left. The patient confesses that he finds it harder to utter words than of old, but there is no apparent difficulty in speaking. Movements of the right arm and

grasp of the right hand are less forcible than those of the left. The sensibility on the inferior and dorsal side of the right hand is less than that on the left hand, so that the patient, for instance, cannot button his waistcoat so well with his right hand as with his left. Sensibility is also slighter in the right foot, than in the left.

The eyes are normal in appearance. The pupils react about alike, though the left is slightly more rapid than the right. Vision is reduced to the distinction between a bright flame and a low flame, and only in a small portion of the field. Ophthalmoscopically there is nothing abnormal.

Vision improved rapidly in the following days, so that at first the patient could count fingers in a small portion of the field and close to the eyes, and later, early in January, 1877, he could by exerting himself see in a small part of the field $\frac{1}{18}$ of the test letters. Colors were correctly recognized. By the end of January central vision was practically normal, but without any enlargement of the field. The condition remained the same till March or April, when vision again began to fail, and the functions to become impaired, but up to his death, August 13, 1877, he could see to the same extent as before, though not quite so well as in April.

The autopsy revealed: diffuse hematoma, cicatricial contraction in the region of the injury; foci of softening in the border between the gray and white substances; in the right temporal lobe an apoplectic cyst, and in the right cerebellar hemisphere apoplectic cysts. Hypertrophy of the heart on both sides. Connective-tissue retraction of the apices of the lungs on both sides; infarction of the spleen, and granulation of the kidneys.

Careful investigation of the calvarium revealed a firm adhesion of the dura mater to the bone, so that on both sides it was impossible to separate them without a considerable injury to the parts. For that reason the spinal cord was freed from below, and the brain, a portion of the skull, and the cord removed all together. A yellowish-green mass came into view on removal of the brain. At the fissure of Rolando was a firm adhesion between the dura and arachnoid about 2 *cm* in length. Between the arachnoid and dura more of the yellowish-green substance containing numerous

hemorrhagic foci as large over as a copper cent, which was easily removed from the dura. There were no traces of adhesion between the arachnoid and dura of the cerebellum.

The brain itself is small, and the right hemisphere, one or two convolutions behind the falx, is depressed over a space the size of a half dollar, yellowish in tinge and rather soft to the touch. There is also a cicatricial depression nearly 1 *cm* deep, 2.2 *cm* long, and 3.5 *cm* across, near the left posterior central convolution. The depression is of a decidedly yellowish tinge in front. The pia over the entire region is of a milky tinge. Looked at from in front, the right temporal lobe looks fuller and broader than the left. The brain as a whole, omitting the cyst above mentioned, feels resistent, and a trifle more so on the left side than the right. The lateral ventricles are empty, though over the corpus callosum is a fresh blood clot which extends into the left lateral ventricle. The left corpora quadrigemina are flatter than the right. The posterior portion of the right occipital lobe between the gray and white substance contains some sharply defined foci with soft greasy contents. The optic thalami vary, the gray and white substance in the left thalamus being hardly distinguishable apart, and with small yellow dots, whilst in the right thalamus white and gray substance are sharply defined, and the gray is even darker than in the left thalamus. Corpora quadrigemina unaltered. The upper side of the right cerebral hemisphere contains a cicatricial depression 4–5 *cm* long, 1 *cm* wide, and 2–3 *mm* deep. A cross section corresponding to the depression reveals a yellow deposit. The fourth ventricle is rather broad, and the striæ acusticæ of the right side more distinct than those in the left. Both optic nerves are flatter than normal, and white on section. The left tractus opticus in front is less round and flatter than the right, and at the chiasm is a distinct constriction. The arachnoidal vessels are much injected. Various sections of the cord showed nothing abnormal.

The optic nerves were submitted to a minute microscopic examination, without, however, revealing anything abnormal, at least no atrophy.

Remarks.

The hemianopsia homonyma dextra in this case was preceded by headache and paresis of the right extremities with clonic spasms. A year later, after a short prelude of sub-

jectively observed contraction of the field, absolute total blindness suddenly ensued. A small central visual field was gradually restored, but slowly it became reduced to a minimum. The autopsy revealed as the cause of the first right-sided hemianopsia a hæmatoma of the dura mater. The right paresis must be regarded as a sequence of the extensive cicatricial contraction in the posterior central convolution. The yellowish bean-sized foci of cheesy matter lying in the region between the gray and white substances in the posterior portion of the right posterior lobe may explain the later loss of the left visual field. The macroscopic condition of the left thalamus and left optic tract is to be regarded as of secondary degeneration, but the optic nerves in their intraorbital course were not affected.

Foerster's case began with a right hemianopsia and with no cerebral symptoms unless a slight headache is so to be considered. But the line of demarcation was not quite perpendicular, and there were defects both above and below the horizontal line, as well as in the region of the macula. Vision was at first $\frac{1}{3}$, later it became normal, and then was totally lost in a very few days. Later still, however, a small portion of the field was discovered with vision of $\frac{1}{3}$. Color sense abolished. Worthy of note was the loss of the recollection of locality: even after remaining for a long time in his own chamber, the patient never could tell where anything lay, nor could he move about half as well as the totally blind, who often learn an astonishing amount of information of their surroundings.

Schweigger's case exhibited a sudden left hemianopsia without any central disturbances. A year later the right field was lost, only a minute central portion remaining intact to the last. Movements of the hand were, however, at times recognized all over the otherwise defective field. There was no loss of the sense of locality.

Groenouw saw left hemiplegia in January in a man of fifty-eight, followed by left hemianopsia in April. Ten months later an apoplectic attack. Remarkable decrease in orientation. Field, ten days later, very narrow in all directions, but vision = 1. In another month an improvement

in the field, but total loss in the right inferior quadrants. Colors visible, centrally.

Vorster saw a case of apoplexy in a man of forty-nine, the second of the sort, the first occurring four years previously with loss of sensibility on the right half of the body and indefinable sensations of loss of sight. Later still, a third apoplectic stroke, with loss of consciousness, left facial paralysis, paralysis of the extremities, and total loss of sight. The patient could not even see the sun. Eight days later, return of vision, so as to see adjacent objects, on the right side only. Four weeks later, hallucinations, and incapacity for finding his way about in familiar places. Vision, Sn 9 at 50 *cm.* Total loss of the left half of field left, and contraction in the right. Nothing abnormal with the ophthalmoscope. Four months later, Vision, Right, $\frac{1}{3}$; Left, $\frac{1}{4}$. Color sense gradually returned. Both halves of the field defective, with exception of a zone surrounding the point of fixation, 10° in extent. Line of demarcation perpendicular. Right field, loss of color perception, except near fixation point; peripheral contraction.

Foerster has drawn from his case certain conclusions which deserve further discussion. The preservation of a small central field despite the loss of all the rest induced him to offer the hypothesis that the small portion in the occipital lobe which serves for the most acute perception, the direct vision, is nourished by abundant anastomoses of two or more vessels. If now the main trunk which nourishes the occipital lobe is thrombosed, and the cortex over a larger extent is consequently cut off from the supply of material, the region of most acute vision might obtain nourishment from the second vessel, and in that way maintain its functions intact. In this way we might also explain in hemianopsia the frequent deviation of the line of demarcation toward the defective side. Foerster further believes that he can utilize this condition in the diagnosis of the location of the focus which causes the hemianopsia, in that in cases in which the line of demarcation passes directly through the point of fixation, the focus does not lie in the cortex but in the path of the tractus itself. Up to this

time, as is well known, the frequent affection of the field in the region of the yellow spot had been explained by the theory that the yellow-spot region is supplied by both tractus optici. Foerster thinks that this is an entirely erroneous idea, because his patient after the second attack ought to have become totally blind. If, on the contrary, we ascribe to that part of the cortex which produces macular vision a greater resistance, we easily see why macular vision remains to the last. Furthermore, in my case, and in that of Vorster, total blindness was present. I should therefore suppose that, in either the one or the other of the previously reported cases of bilateral hemianopsia, there must have been in the very beginning of the loss of the visual field a rapid but transitory loss of sight. From all this we see that there is no compulsory reason to abandon the idea that the macular region in a certain series of patients has a bilateral nourishment from the blood-vessels. It is also plain that the cases reported by Wilbrand,[1] with autopsies, confirm such a view. And we further see from these contributions that Foerster's hypothesis of being able to diagnosticate the locality of the lesion from the course of the line of demarcation is in direct opposition to these facts. Other facts in support of my views are these. Whilst the perimetric measurements in hemianopsia show that the defect in the field does not always correspond with the perpendicular, but that the intact field often passes the perpendicular, or inversely the defect crosses over into the percipient halves, the defect never passes over into the seeing halves at the point of fixation. Either the line of demarcation passes directly through it, or it lies in those halves of the eye that still perceive. These variations in the line of demarcation are in my opinion the outcome of individual variations in the expansion of the retinal fibres of the tractus opticus. All in all, one half of the retina is supplied by one tractus, the other by the other tractus, though the supply need not mathematically correspond to the precise line of demarcation. This, too, seems quite satisfactory, for if

[1] *Die hemianopischen Gesichtsfeld-Formen*, 1890, p. 109.

nature with her division of the nerve fibres had made every arrangement for perimetrical measurement of the visual field, the slightest radial deviation of the eye would disturb this beautiful coincidence, and be followed by a deviation of the halves of the visual field from the perimetrical perpendicular. If, now, experience teaches us that in hemianopsias the point of fixation always lies in the halves of the field that see, we must come to the conclusion that it is supplied by both tractus, for so only can we explain that it is never drawn into the defect in contra-distinction to those portions lying above or below it in perpendicular meridians of the retina, where the individual variations of the division of the tractus are so clearly to be seen. The physiological importance of this region, as well as the anatomical size of the macular nerve-fibre-bundle, give further support to the theory of double supply.

Foerster's hypothesis that the cortical region which corresponds to the macula is particularly capable of resistance, finds much support in all the cases that have so far been reported. But whether this depends upon a peculiar arrangement of the vessels or upon other foundations must still remain an unanswered question. My case does not seem to argue directly in favor of any particular role having been played by the subdivision of the blood-vessels. It is remarkable to see how, in opposition to this great resistance-capacity of the macular cortical regions, the macular fibres running into the optic nerve are chiefly exposed to disease and disturbances of function, as is demonstrated by the frequent observations of central scotomata.

Whilst Foerster's patient permanently lost the power of perceiving colors, the faculty returned in the cases reported by Groenouw, Vorster, and myself.

The decrease in the capacity for orientation which Foerster has so closely studied is, I regret to say, not mentioned in my case, for I watched my patient before Foerster had called attention to this peculiarity in similar cases of hemianopsia. Groenouw observed the defect in his patient, and Vorster remarks upon the difficulty that his patient had in finding his way about, though in this case we must not

forget the patient's loss of mental equilibrium. Schweigger, on the contrary, could not see that his patient suffered from any such disturbance. Hence it is plain that further observations may be needed before we can assert with Foerster that such is a common symptom of hemianopsia.

The condition of the pupil reflex corresponds to the anatomical seat of the lesion as beyond the reflex curve. In hemianopsic visual-field defects, the cause of which lay this side of the curve, I have often seen a sluggish reaction on illumination of the corresponding halves of the retina. Hence there need not necessarily be total absence of the reaction simply because some light also falls upon the parts that still perform their function. The best method of testing is to throw with the ophthalmoscope small images of the flame, now upon one and then upon the other half of the retina, whilst, in the interval, the pupillary reaction is watched by a second observer. And yet in the diagnostic valuation of this symptom we must bear in mind, that even in a paralysis lying beyond the reflex curve, atrophy and subsequent loss of conduction from secondary degeneration may affect the reflex fibres additionally.

THE POSITION OF THE SOURCE OF LIGHT AND THE OBSERVER IN SKIASCOPY OR THE SHADOW TEST.

By EDWARD JACKSON, A.M., M.D.,

PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC, SURGEON TO WILLS EYE HOSPITAL.

IN skiascopy, we seek to measure the amount of myopia, either natural or produced by lenses; or to ascertain what lens is required to produce a certain amount of myopia. The amount of myopia is ascertained, the point for which the eye is focused is determined by the apparent movements of light in the pupil, which indicate whether this point is behind the observer's eye or in front of it. The apparent movements of light and shadow across the pupil are produced by the real movement of an area of light upon the pigment layer of the retina or choroid.

This light area upon the fundus of the eye is the more or less perfect image of the source of light employed for the test. In order that its movements may be most definite and readily discernible, it should be as small and as brilliant as possible, conditions attained when the image of the source of light is most perfect—that is, when the light from the lamp flame employed is most perfectly focused upon the retina.

The lamp flame used we may call the *original source* of light. The mirror reflecting the rays from this source gives rise to an image of it, which may be called the *immediate source* of light, because the rays enter the eye as from a source of light in the position of this image.

With the plane mirror, the image is a virtual one, situated

behind the mirror as far as the original source of light is in front of it. With the concave mirror, the immediate source of light is a real image, formed in front of the mirror at the focus conjugate to the position of the lamp flame or original source.

It is the differing movements of this immediate source of light that give the opposite movements of the light area in the pupil, according as the plane or the concave mirror is employed.

Now the problem as to the position of the source of light in practising skiascopy is simply the problem of bringing the immediate source of light as near as possible to the point of reversal of the eye examined—that is, to the point for which the eye is focused; since from that point the most perfectly focused image of the source of light will be formed on the retina.

When the point of reversal is determined—when the final and most accurate measurement by skiascopy is made—the observer's eye and the mirror held in front of it will closely approximate the point of reversal; or the point of reversal will, by the lenses used, be made to closely approximate the position chosen for the observer's eye. It becomes necessary, therefore, when the final or accurate application of the test is to be made, to have the immediate source of light (that is the image of the original source formed by the mirror) as close as possible to the observer's eye.

With a plane mirror, the *immediate* source of light is as far behind the mirror as the *original* source was in front of it. The closer the original source is brought to the mirror, the closer will the immediate source be brought to its desired position. Hence, *with the plane mirror, the lamp flame should be brought as close to the mirror as possible.*

With the concave mirror, the immediate source of light being an image of the lamp flame, conjugate to the flame itself, it will retreat from the mirror as the lamp flame is brought towards it; and will approach the mirror as the lamp flame is carried farther away, until when the lamp flame reaches an infinite distance, the image of it, which is the immediate source of light, will reach the principal focus of

the mirror. Nearer than this it cannot be brought. *With the concave mirror*, therefore, *the immediate source of light is brought to its most desirable position by carrying the original source as far behind the patient as possible.*

The position of the original source of light then should be for the plane mirror as near it as possible, and for the concave mirror as far as possible behind the patient. The necessity for interrupting the reflection of the mirror from an area at its centre to give the sight hole, through which the movements of light are to be watched, limits the possible accuracy of the test; so that it is as accurate as practicable if the light is within a few inches of the plane mirror, or at a distance of 2 metres or more from the concave mirror.

The approximation of the immediate source of light to the point of reversal will also depend upon the position of the observer's eye. With the plane mirror, the immediate source being back of the mirror, will be nearest to the point of reversal when the observer's eye is in front of that point; that is, when he follows the direct image of the eye he is looking at and gets the movement of light in the pupil with the movement of light on the face. Therefore, *the greatest distance at which the light in the pupil moves with the light on the face will be the closest approach to accuracy with the plane mirror.*

On the other hand, with the concave mirror the immediate source of light being in front of it, will be nearest the point of reversal when the observer's eye is beyond the point of reversal, where he obtains the inverted image of the fundus looked at and where, also, the light in the pupil moves with the light on the face. Therefore, *with the concave mirror, the closest approach to accuracy will be made in the determination of the nearest point to the patient's eye that the light in the pupil moves with the light on the face.* Such are the conditions as to the position of the light and of the observer for simple hyperopia and myopia.

ASTIGMATISM.

In astigmatism we have to consider two points of reversal instead of one. The retinal light area presents at either of

these points of reversal the appearance of a band running in the direction of the meridian, whose point of reversal is at the observer's eye. If, in the direction of this band, it is desired to determine just where the point of reversal is, the immediate source of light must be brought as near as possible to the point of reversal for this meridian; that is, we must arrange the position of the light and of the observer just as in simple hyperopia and myopia.

If, however, it is desired to bring out the band with the greatest distinctness, so as to determine if such an appearance of the retinal light area is really present, or to fix its direction with the greatest accuracy, the arrangement of the light must be different. The band, in order to be seen most distinctly as a band, demands that the light shall be sharply focused from side to side: while it is indifferent as to how it is focused in the direction of the band. The focusing at right angles to the band depends upon the effect of the cornea at right angles to it, upon the refraction of the cornea in its other principal meridian. To get the most perfect focussing in that other principal meridian, the source of light must be made to correspond with its point of reversal. Hence, *to bring out most distinctly the characteristic band-like appearance of the light in the pupil, the observer must place his eye at the point of reversal for the meridian in which he wishes to obtain the band, and place the immediate source of light at the point of reversal for the other principal meridian.*

Suppose it is desired to determine the direction of the principal meridian of greatest myopia, commonly the vertical meridian. The band in this direction will be seen at its point of reversal, which is, of the two, the point of reversal closer to the eye. Here, then, the surgeon must place his own eye. Using, then, the plane mirror and then moving the original source of light as far from the mirror as the distance between the two points of reversal, the band-like appearance in the light will come out with the greatest distinctness. It will be clearly visible even though the astigmatism be less than 1 D.

On the other hand, if he desires to bring out the band

which runs in the direction of the meridian of least myopia, he must place his eye at the point of reversal of that meridian, the point of reversal which is, of the two, the farther from the eye.

Now, to secure the placing of the immediate source of light at the other point of reversal, which is between the observer and the eye he is looking at, it will be necessary to employ the concave mirror, which gives the immediate source of light in front of it. And the distance of the image in front of the mirror is to be varied by changing the distance of the original source of light from the mirror.

For instance: Suppose the patient to be in the vertical meridian, myopic 2 D, and in the horizontal meridian, myopic 1 D. To get the vertical band of light in the pupil, the surgeon places his eye one half metre from the patient (at the nearer point of reversal). The other point of reversal, where the immediate source is to be placed, being one metre from the observed eye, will then be one half metre back of the mirror; and the original source of light will, therefore, need to be placed one half metre in front of the mirror.

When these conditions are complied with, there will be observed a very distinct vertical band moving from side to side with the light on the face, but which cannot be observed to move in the vertical direction.

To study the horizontal band the surgeon must come to the point of reversal for the horizontal meridian one metre from the eye, and to make it most decided will require his immediate source of light one half metre in front of him, and one half metre from the patient's eye. To do this he must use a concave mirror. Suppose it to have a focal distance of 25 cm; then, to bring the immediate source of light 50 cm from the mirror, the original source must be brought up to the same distance from the mirror. The conditions, then, for studying the direction of this band are: the observer one metre from the eye with a concave mirror of 25 cm focus, and the light 50 cm away from it. And under these conditions, with a single dioptrie of astigmatism, the band will be very distinct.

In practice, it is only necessary to fix the direction of one principal meridian; and make the measurements of the refraction in both of them. This can be done with either the plane or the concave mirror. With the plane mirror the meridian of greatest myopia or least hyperopia will be fixed, with the concave mirror the other principal meridian; each showing the band which moves with the light on the face.

Probably all who have employed skiascopy to any considerable extent have been puzzled by the differences of the distinctness of the band produced in astigmatism at different times or in different cases. These relations of the positions of the source of light and the observer's eye to the observed eye explain such variations for the greater number of cases. Other factors not without influence are the aberration of the eye and the amount and kind of irregular astigmatism; also the size and brilliancy of the source of light employed, but unquestionably the principal source is the failure to observe the conditions of success above indicated.

Skiascopy has too often been attempted by the guidance of certain rule-of-thumb directions, without any clear understanding of its optical basis; and the confusing results from such attempts have more than anything else retarded its progress towards universal employment.

SOME REMARKS UPON RETINOSCOPY AS A METHOD OF DETERMINING THE REFRACTION OF THE NUCLEUS OF THE LENS.

By JOHN DUNN, M.D., Richmond, Va.

FOR the past three years I have been using retinoscopy as a method for determining the refractive condition of the eyes, and, generally, I have found it altogether reliable both in regard to the degree of myopia and hyperopia, and as a method of determining the axis of astigmatism and the degree to within ¼ D. There have been two classes of cases where I have been disappointed in the accuracy of this valuable method, and a few remarks in regard to one of these cases may not be out of place. Reference is made to those cases where in applying the shadow test we get a confusion of shadows, so that after we have obtained the "shadow in all directions" that should mark the turning-point, we find that it requires a whole additional dioptrie or perhaps one and a half to reverse the shadow. At times we even get from the same half of the eye two shadows moving in different directions at the same time, or a double shadow of different intensities. And we find that, when we finally reverse the shadow as a whole and adjust before the eye of the patient the glass we expect to suit, the glass chosen does not give the best vision for distance; that much clearer vision can be obtained by the addition of a weak plus or minus glass, or of a cylinder. These cases occur frequently enough to offer a distinct objection to what is, when properly understood, the most valuable of all the methods of determining the refraction of the eye. The explanation of this "confusion of

shadows" lies in the fact that in these cases *the refraction of the nucleus of the lens is different from that of the outer part of the lens.* So far as I know there is no means other than retinoscopy by which can be measured the refraction of the nucleus of the lens, when this nucleus is of such a density as to differ in its refractive power from the lens as a whole. By means of retinoscopy this refraction can be determined to $\frac{1}{4}$ D. Let us take the following case as an example:

Mr. Mann, aged thirty-one, pupil fully dilated by homatropia. Holding a + 1 D sph. before the right eye and revolving our mirror for the vertical meridians, watching the edge of the iris, we see that no definite shadow movement is to be obtained, either from the inner or the outer side of the pupil. The same is found to be the case for the horizontal meridians as determined by revolving our mirror up and down. Holding before the eye a + $1\frac{1}{4}$ D sph. we find that the movement of the shadow from the iris edge is with the movement of the mirror; a + $\frac{3}{4}$ D sph. furnishes a shadow moving against the mirror. Thus a + 1 D furnishes "shadows for all directions alike." The patient's refraction should be normal. He should read our Snellen $\frac{1}{1}\frac{8}{8}$. Ask him to do it and we find that he can read only $\frac{1}{4}\frac{8}{6}$. What is the matter? Retinoscopy is not at fault. Let us look a little more closely at our shadows. Holding a + 1 D sph. before the right eye and revolving our mirror for the vertical meridian of the inner half of the eye, what do we see? While it is true that the pupillary edge furnishes no definite shadow, if we look closely we see a second shadow, which makes its appearance about half way from the centre of the lens to the pupillary margin, and this shadow moves *against* the movement of the mirror. Neglecting now the pupillary edge shadow we turn our attention to this inner shadow. It moves *against* for + $1\frac{1}{4}$ D; *against* for + $1\frac{1}{2}$ D; its movement cannot be made out for + $1\frac{3}{4}$ D; for + 2 D its movement is with the movement of the mirror. Let us now see what it does for the horizontal meridians; this inner shadow moves *against* for + 1 D sph.; is indeterminate for a + $1\frac{1}{4}$ D; moves *with* for + $1\frac{1}{2}$ D. Thus + $\frac{3}{4}$ D is the lens for the vertical meridian; + $\frac{1}{4}$ D for the horizontal meridian—*of the nucleus*, and with a + $\frac{1}{4}$ D sph. c + $\frac{1}{2}$ D cyl. ax. 90° Mr. Mann reads $\frac{1}{1}\frac{8}{8}$ with ease.

When we have a + 1½ D sph. before the eye, if we watch both shadows for the inner half of the eye at once, and the same applies for the outer half, we find that the *cortical* shadow moves *with* the mirror while the *nuclear* shadow moves *against* it. Thus we have in the same half of the eye at the same time two shadows moving in opposite directions. The movements of both of these shadows can be seen, inasmuch as there is at the beginning of the movement a clear space between the iris edge and the nucleus. Let us take O.S.: a + 1 D sph. held before the eye gives from the pupillary edge an indeterminate shadow when the mirror is revolved for either the vertical or horizontal meridians. We should expect the patient to read $\frac{18}{18}$ Snellen with ease. He read only $\frac{18}{36}$. Again we look more closely and we find when we move our mirror for the vertical meridians that while the pupillary edge furnishes no determinate shadow, there is a shadow moving against the movement of the mirror, which shadow proceeds from a distance half way from the centre of the lens to the pupillary edge. Now, watching this inner shadow, we find that it moves *against* the mirror for a + 1 D, + 1¼, D, and + 1½ D; is indeterminate for a + 1⅝ D sph.; and moves with the mirror for a + 2 D sph. For the horizontal meridians this inner shadow is indeterminate for a + 1 D sph. and moves with the mirror for a + 1¼ D. Consequently we should expect a + ⅜ D cyl. ax. 90° to give V = $\frac{18}{18}$, which it does. When we are holding a + 2 D sph. before the eye, and revolving the mirror for the vertical meridian, we see two shadows moving in the same half of the eye at the same time in the same direction; these shadows have, however, different intensities, the one proceeding from the pupillary edge being denser than the one proceeding from the nuclear edge. Thus in the case of Mr. M., the refraction of eyes beyond the nucleus is normal; while for the nucleus the refraction O.D. is + ¼ D sph. c + ½ D cyl. ax. 90° and O.S. is + ⅜ D cyl. ax. 90°.

Or, again, the case of Mrs. C., aged forty, O.D., V = $\frac{18}{18} - \frac{18}{36}$. O.S., V = $\frac{18}{18} - \frac{18}{30}$! Homatropia. Complete dilatation of the

pupil. *O.D.* + 1 D held before the eye; revolving our mirror for *the horizontal meridians* we find that the shadow from the pupillary edge is with the movement of the mirror, we consequently should expect to find a minus glass necessary for this meridian. We change + 1 D to + $\frac{3}{4}$ D and we feel that the pupillary edge furnishes for the horizontal meridians no determinate shadows; while + $\frac{1}{2}$ D gives a shadow against. Let us now test the vertical meridians for a + 1 D sph. The pupillary edge shadow is against the movement of the mirror; so for a + 1 $\frac{1}{4}$ D; + 1$\frac{1}{2}$ D; + 1$\frac{3}{4}$ D; while for + 2 D sph. the pupillary edge shadow is indeterminate; by the old method of measuring from the pupillary edge shadow the required glass would be − $\frac{1}{2}$ D cyl. ax. 180° c + 1 D cyl. ax. 90°, and while this glass will on trial be found to raise V to $\frac{18}{20}$ − $\frac{18}{16}$, it will not give $\frac{18}{16}$ Snellen, which it should do. Again, retinoscopy is not at fault. Let us look more closely. Let us take first, as before, the horizontal meridians, holding a + 1 D sph. before the eye, O.D., we find that the pupillary edge shadow moves with the mirror; but if we look we shall see that the shadow cannot be made to move with distinctness further than a point something less than half way from the iris edge to the centre of the cornea, for at this point a second shadow will be seen to originate and one whose movement is distinctly *against* the movement of the mirror; this is the *nuclear* shadow. Now neglecting the pupillary edge shadow and watching this nuclear shadow we find that it takes a + 1$\frac{1}{2}$ D sph. to give for this shadow an indeterminate movement. Hence while the refraction of the cortical part of the lens for the horizontal meridians is − $\frac{1}{2}$ D, that for the nucleus is + $\frac{1}{2}$ D. In the same way for the vertical meridians we find that while + 2 D gives an indeterminate shadow for the pupillary edge or cortical shadow, it requires a + 2$\frac{3}{4}$ D to give the same for the nuclear shadow. Hence for the vertical meridians, while the cortical refraction is + 1 D, that for the nucleus is + 1 $\frac{3}{4}$ D. Hence, further, we should expect the refraction for the nucleus to be + $\frac{1}{2}$ D sph. c + 1$\frac{1}{4}$ D cyl. ax. 90°, which glass before O.D. gives V = $\frac{18}{16}$, with many letters in $\frac{18}{16}$. And following the same methods we find that the nuclear refraction O.S. is + $\frac{1}{2}$ D sph. c + 1 D cyl. ax. 90°.

These two cases are enough to explain the point to be made in this communication. Some time since I reported one case where the nuclear refraction had been determined

by retinoscopy. These additional remarks are made, because since then I have been led to believe that the majority of the cases, where heretofore retinoscopy has failed to give results which agreed with the actual visual tests, are to be explained by the fact that our results have been for the *cortex* and not for the *nucleus*. Furthermore, I have found that a much larger percentage of cases gives for the nucleus a refraction different from the cortical part of the lens than I had expected. The recognition of this second, or nuclear, shadow is important and will serve to give additional value to the most valuable test we have for determination of refraction of the eye. Sometimes the pupil will not dilate sufficiently to allow us to distinguish between these two shadows, even though they exist. Sometimes it requires careful watching to *catch* this second shadow, but its recognition and its interpretation will serve to clear up doubts "about what glass to give." For the nucleus represents the constant element; the cortex, the element that is capable of variations to suit varying distances, *i. e.*, the accommodative element in the refraction of the lens. And in prescribing glasses we may neglect the element that in refraction is subject to perpetual variations in the acts of accommodation—correcting the fixed error.

CONTRACTION OF THE VISUAL FIELD IN TRAUMATIC NEUROSIS.

By Dr. E. FISHER, of Dortmund.

Translated by Dr. J. A. Spalding, Portland, Me.

AFTER the publication of 33 cases under the above title by Oppenheim, it might seem superfluous to add only two more, were it not for the fact that Oppenheim's views have lately been contradicted by several competent observers. Schultze in particular asserts that in many cases of functional diseases after injury the contraction of the visual field and the anæsthesia *did not occur*. Out of twenty of his own cases, fourteen exhibited a normal V. F., one or possibly two were slightly contracted, three were very doubtful, and in one the measurement was impossible. And of the local anæsthesia, he says: "I only discovered it in three cases out of twenty-three, and even in these three I was not sure that I could rely on what the patients said."

More than that, he refers the disturbances of motion to hysteria, and the long train of symptoms of sleeplessness, pressure in the head, tremulous muscles, motor weaknesses, painful sensations in sacrum and back, violent throbbing of the heart, and so on, to neurasthenia, till of Oppenheim's clinical picture there is nothing left but a name, and the suggestion that traumatic neurosis is nothing but the last refuge of the malingerer.

Although I cannot but acknowledge that a good deal of nonsense may be carried on under the name of "traumatic neurosis," yet I am convinced that there are typical cases which deserve the name that has been given to them.

Amongst these I would like to publish the following, which, beside exhibiting all the prominent symptoms, occurred in a patient who could not possibly be a malingerer as the history will plainly show.

The patient, aged forty-eight, had been for some years the superintendent of large manufactories in Dortmund, but had given notice of resignation of the position in August to assume a better position in similar manufactories in a neighboring town.

Before assuming the new place he met with a railroad accident which placed him in the fatal position of being compelled to give up his old situation and yet to be unable to accept the new one. He was leaning out of the window when a collision occurred, and whether he hit his head against the frame or not he cannot recall. But the only direct result was a swelling on the occiput. He walked to the nearest station where his agitated appearance attracted general attention.

From this he suffered from sleeplessness, pressure in the head, vertigo, and psychical depression. His eyes felt as if sinking into his head, and then again as if bursting out of the orbits. The old convex lens formerly used in reading did not now prevent rapid exhaustion of the eyes for near work. His memory was defective, and the turmoil and bustle of the great factory unendurable.

My examination on May 27th showed normal vision, slight contraction of V. F. for white and considerable contraction for colors. Four weeks later the contraction for white had noticeably increased.

The entire head showed diminished sensitiveness, variations in temperature, and lack of sensibility to the head or point of a pin. The latter was also well marked on the back and extremities. There was also lack of co-ordination, and use of the feet, but no symptoms suggesting cerebro-spinal disease.

Professor Uhthoff who saw the patient in consultation emphasized the abnormal pupil reaction, "in that with peripheral illumination of the retina and the use of slight variations in light, the pupil contracts very rapidly."

The prognosis of this case is, as any one can see, very unfavorable.

This is the most remarkable case that I have ever observed and I doubt if there can be any malingering here.

It is well known that Oppenheim does not stand alone in his discoveries of concentric contractions of the V. F., and that several of his cases have been verified as correct, by Schweigger, Uhthoff, and Wilbrand.[1]

[1] For the sake of brevity the second case here reported and the visual-field charts have been omitted in the English edition of these ARCHIVES.

(H. K.)

DISLOCATION OF THE LENS INTO THE ANTERIOR CHAMBER WITH IRIDODIALYSIS; EXTRACTION; RECOVERY.[1]

By C. ZIMMERMANN, M.D., Milwaukee, Wis.

M. B., a healthy-looking man, fifty-three years old, came to me November 3, 1892, with the statement that at 1 A.M. he had received a severe blow on his left eye with the stick of a whip by a man whom he attempted to push downstairs. A surgeon was sent for at once, who put a stitch through a wound of the upper lid, below the eyebrow, 2 *cm* long, and referred the case to me in regard to the eye. There was another more superficial wound of the lower lid near and parallel to the ciliary border, 1.50 *cm* long, which had not been sewed. Both lids were very much swollen and the ocular conjunctiva chemotic. There was no penetrating wound of the globe, but the lower nasal third of the iris was detached from its ciliary border. The pupil was drawn upward and the margin, formed by the separated portion of the iris, was changed into a straight line. The natural and the traumatic pupil looked black; no blood in the anterior chamber. The severed part of the normally blue iris had a green hue and lay farther back than the remaining iris. The cornea showed striated opacities, chiefly in a horizontal direction, the seat of which appeared to be Descemet's membrane. On ophthalmoscopic examination, the artificial as well as the natural pupil gave a red reflex, and in the latter a dark arc with its convexity upwards was noticed, the border of the lens, the lens being dislocated into the anterior chamber. The detached portion of the iris was magnified through the lens, and the green tint seen to be due to the amber color of the latter. V = fingers in 5 feet. V. F. normal. No

[1] Read at the Wisconsin State Medical Society, May 4, 1893.

double vision. A pressure bandage was put on. Chemosis and the corneal opacities disappeared in a few days, and the lens became much more clearly visible, looking like a drop of oil in the anterior chamber. The eyeball still red, the upper lid œdematous, but there was no pain at all. Tension not increased. Nov. 18th he complained of pain on the top of his head and at the infraorbital margin. Nov. 19th he slept well, but the œdema of upper lid not disappearing and the eyeball being redder with increase of intraocular pressure, I advised extraction of lens. The patient consenting, I removed the lens Nov. 20th under aseptic measures, with von Graefe's knife, by upper corneal section, the apex of it 2 *mm* below the limbus. Although vitreous prolapsed as soon as the incision began, I quietly finished it. The speculum was removed at once and the lens expelled within its capsule by gently pressing the lower lid with my left index finger on the lower part of the eyeball towards its centre, while I directed the upper lid and the peripheral edge of the wound with my right forefinger. The patient, being very unruly (despite cocaine) lost some vitreous. After he was bandaged he complained of pain in the eye, which however was promptly relieved by antipyrine. Nov. 24th the first change of dressing (4th day). No discharge, wound nicely closed, no prolapse of iris. At the temporal corner of the wound a small gray thread of vitreous projected, which I left undisturbed, lest by snipping it off the wound might burst, until Dec. 27th, when I cut it off. Feb. 9th V with + 10 D = $\frac{15}{200}$.

Details of the fundus can be seen, although a little veiled by slight opacities of the vitreous, appearing in horizontal wave-like dark lines. The eye is without the least irritation. The detached portion of the iris has now the same color as the remainder. This piece being in the centre, it impairs the sight to a certain extent. The patient however mostly uses his artificial pupil and is not annoyed by monocular double images. So far I thought it to be too great a risk to cut this piece with intraocular scissors, as not much could be gained.

Some features in this case deserve especial attention:

1. The manner in which the injury happened is quite interesting. The blow must have struck the upper portion of the eyeball with such vehemence, that the upper periphery of the lens was pushed backwards and turning on

its transverse diameter as axis was driven with its lower periphery against the iris, tearing the latter from its ciliary margin and entering through this gap into the anterior chamber, so that the posterior surface of the lens was now in front and towards the cornea, the lower lens border turned upwards.

2. The great force of the blow explains also the absence of hemorrhages from the ruptured blood-vessels of the iris.

3. In regard to the corneal opacities seen at first, the objection might be made, that I erroneously located them in the cornea, whereas they were in reality in the lens touching the cornea, and were analogous to the apparent opacity of the lens, which may be observed, when after sudden advancement of the latter by evacuation of the aqueous, the layers of the lens suffer a displacement along each other within the capsule and reflect incident light like a soft cataract (*cf.* Becker in *Graefe-Saemisch*, v., p. 280). But then they would not have disappeared as they did after a few days, as the lens did not change its position next to the cornea. In my opinion they represented the optical appearance of wrinkles of Descemet's membrane and the deeper corneal layers, in a horizontal direction, caused by a compression and flattening of the eyeball from above downwards, in consequence of the blow acting from above. Thus the horizontal meridian of the cornea was stretched and its radius elongated, that of the vertical meridian shortened. Hess (*von Graefe's Arch.*, xxxviii., 4, p. 1) proved anatomically and experimentally, that the striated opacities of the cornea after cataract extractions are to be explained in the same way (the direction of the compression only differing from that in our case). They consist in wave-like wrinkles of the deeper corneal strata and are produced by the difference in curvature of the vertical and horizontal meridians of the cornea, the radius of the vertical meridian becoming larger after the opening of the eyeball, acting as if the eyeball was compressed from both sides. In our case the opacities disappeared very soon, the eyeball gradually reassuming its natural curvature, thus furnishing a further support of this explanation.

CONGENITAL UNILATERAL ANOPHTHALMUS.[1]

By C. ZIMMERMANN, M.D., Milwaukee, Wis.

CONGENITAL anopthalmus is mostly bilateral and has been found to occur in different degrees, either limited to the eyeball, or to the eyeball and the optic nerve and its central terminations, or even associated with defect of a large area of the brain. The adnexa of the eyeball are mostly developed. Unilateral anophthalmus, called also monophthalmus, is much rarer. (It must not be confounded with cyclopia, which means confluence of both eyes into one double eye in an abnormal place, viz., at the region of the glabella.) The time of its development is attributed to a late period of fœtal life, if only the globe is missing, not its appendages. In most cases remnants of a globe were left, sometimes not as large as a pea, characterized as such by the presence of choroidal pigment. Others showed orbital cysts, starting from such rudiments, and in others no trace of an eyeball could be detected. The theory is, that by external causes the eyeball at first well developed suffered an arrest of evolution, and consequently degeneration and complete destruction. Nearly all observations were made in children. I saw a case in an adult, which, as it exhibited some other malformations besides, may be of sufficient interest for a short communication.

The patient, a robust man, thirty-three years old, six feet one inch high, weighing two hundred and twenty-seven pounds, is perfectly intelligent. He is the third child of healthy parents

[1] Read at the Wisconsin State Medical Society, May 4, 1893.

(not consanguineous), and neither these nor his sisters and brothers suffered from any malformations. The right eye is perfectly healthy and normally shaped in all its portions and appendages, V., V. F., and ophthalmoscopic condition normal. The left eyeball is wanting. Its adnexa are in their normal place and all developed, but of diminished size. The lids are smaller, the upper one slightly entropic with its ciliary margin touching the lower one, which is a little ectropic. The palpebral fissure is 2 *cm* long (in right eye 3.5 *cm*). Caruncle, lachrymal points, and lachrymal gland are there, tears flowing from the eye just as from its fellow on irritation. After insertion of lid-retractors a diminished empty conjunctival sac is exposed, in the depth of which no trace of an eyeball can be seen nor felt. The finger finds a soft cushion, feeling as the contents of the orbit do after enucleation. The conjunctiva at the bottom of the sac looks a little whitish from the underlying Tenon's capsule. The presence of the ocular muscles becomes evident by their action, as the sac moves in all directions in association with the other eye. Neither pressure nor the faradic current creates any sensation of light, so that absence or degeneration of the optic nerve may be inferred. The left orbit is considerably smaller than the right. The height at the supra-orbital foramen : L, 2 *cm ;* R, 3 *cm.* Greatest horizontal width : L, 3 *cm ;* R, 4 *cm.* Left eyebrow 5 *cm* long ; R, 6.5 *cm.*

The skull is asymmetric, the left portion of face and forehead being smaller than the right. The left side of the forehead is receding as well as the hair on this side. The following measures were taken with the compass : Longitudinal diameter (root of nose to occipital protuberance), 18 *cm.* Root of nose to tuberculum radicis arcus zygomatici (above and behind the ear) L, 12 *cm ;* R, 12.5 *cm.* The width between both ears, *i. e.*, between the above-mentioned tubercula, 15 *cm.* Width between both tubera parietalia, 16 *cm.* Distance of external walls of both orbits, 10 *cm.* Figures obtained with tape-measure : Horizontal circumference of head, taken from centre between both arcus superciliares to occipital protuberance, 56 *cm.* The left (pathological) half of it measures 29 *cm*, the right only 27 *cm*, the left parietal bone showing a greater extension than the right, compensating for the diminished size of the left side of the forehead. Root of nose to the external wall of left orbit, 6 *cm ;* of right orbit, 7 *cm.* Frontal arch between the roots of both arcus zygomatici, 32.5 *cm.* The

patient has a cranium progenæum, the lower jaw forming an overbite over the superior maxillary. The palatal vault is very high and narrow. The left superior maxillary is smaller than the right and has one tooth, the canine, less than the right. The posterior wall of the pharynx projects more on the right than on the left side. In posterior rhinoscopy the left choana appears to be smaller than the right. The deviation of the nasal septum to the right in front is due to a fracture he suffered when fifteen years old.

The left auricle shows also a deformity. Its lobe is rudimentary, and the whole auricle looks as if it had been rolled up in a forward direction and drawn forward. Its posterior aspect nearly forms a plane, without bends and elevations, and stands out at right angle with the head, so that the anterior limit of the helix lies in one frontal plane with the posterior wall of the external ear opening. In a profile view it seems to cover half of the concha. In the skin, 0.75 *cm* in front of the tragus, is an elevated scar 1 *cm* long (vertical diameter) and 0.56 *cm* wide (sagittal diameter) where, according to the patient's statement, the auricle was attached at birth and was severed by operation soon afterwards. A small scar at the posterior surface of the helix corresponds exactly to that place. When the auricle is rolled forward, both scars touch each other. After the inspissated cerumen was removed, the auditory canal and *Mt* appear perfectly normal, as well as the hearing power, so that the malformation of the hearing organ is limited to the auricle. There is no other asymmetry, except that the left foot is thicker than the right.

The story the parents give in this case is this: The boy was born in a position in which he held his left hand on the left eye, pulling the left auricle forward with his fingers. The eye was wanting, and the ear was firmly attached to the head. The left leg was drawn upward and, when stretched, tended to return to that position, so that it had to be fixed on splints. Hœderath (Ueber Monophthalmus congenitus, Inaug. Diss., Bonn, 1871) described two similar cases observed in the eye-clinic at Bonn, one of which is just like ours, if not the same, since our patient has been examined by Professor Sæmisch of Bonn in 1867, when seven years old. Hœderath, however, reports his age as eleven years

and gives a different first initial. He writes, that the left arm retained the same position on the eye as at birth for a fortnight afterwards. Manz (*Græfe-Sæmisch*, ii., p. 125), in quoting this case of H., seems to consider the anophthalmus to be of traumatic origin, caused by the pressure of the hand, leaving it undecided whether the peculiar position of the arm may have been due to a constriction by amniotic threads, or the umbilical cord. If this had been the case, the constriction must have been very firm, so that we would expect to find some traces of it on the arm or hand, an atrophic spot or a scar, or some other malformation, but there was nothing of the kind. As not only the eye and ear, which alone might have suffered from the pressure of the hand, but even the whole left side of the head were defective, this factor loses its value as the only cause of the malformation. The child's condition at birth not having been communicated by an expert, we are not allowed to adopt at once the parents' pretty vague narration and base theories on it. The father told me that at first they thought the midwife had injured the eye and had invented that story for her exculpation. Apparently he had not seen the asserted position, nor had the mother, as they at first tried to conceal from her the existence of such a deformity. The case however is of especial interest, as being one of those rare instances in which the anophthalmus was observed in an adult, and corroborating the assumption that this malformation was due to an arrest of development, with consequent destruction of the eyeball in a pretty late period of fœtal life, when the eyeball was already developed, as we infer from the presence of its appendages, and not caused by a primary deficiency; else we could not expect such perfectly healthy mental and otherwise bodily development as seen in our patient.

EXTRACTION OF PART OF THE CAPSULE AS AN OPERATIVE PROCEDURE IN CERTAIN CASES OF SECONDARY CATARACT.

By JOHN DUNN, M.D., Richmond, Va.

Mrs. Vest, aged seventy-four, consulted me in August, 1892, in regard to her eyes. Diagnosis, double cataract. Lenses were, however, clouding in flakes and very slowly. Advised ripening and extraction. Patient disappeared. Reappeared on April 14, 1893. Mrs. V. had been to another city, where Förster's operation for ripening had been done, after which extraction and then capsulotomy. Result: Vision nothing, or, rather, bare perception of light. Examination of the eye showed a well knit corneal extraction scar; a well made, complete, upward coloboma of iris, whose edge was apparently everywhere, except perhaps centrally below, adherent to a thick capsule, in which there was no opening. In the centre of the coloboma below, viewed from above, there was apparently communication between the anterior and posterior chambers, through an opening perhaps ½ to 1 *mm* in diameter. The thickened capsule, however, extended below the iris edge so that no light entered the eye through this opening. *Tension above normal.* Signs of slight circumcorneal irritation. No pain on pressure, although patient wore dark glasses. She had been using atropia constantly since date of last operation, but it had had no effect on the iris.

The question here was the best method of treating this condition of the eye. About two years ago I had under treatment a similar case, where, owing to the thickness of the capsule, I was unable to obtain in it a permanent opening and where my attempts to do so resulted in glaucoma,

which hot applications, pilocarpine internally and to the eye, atropia, repeated paracenteses and even iridectomy failed to give more than temporary relief. What would have been the final result I cannot say, as the patient died from an attack of la grippe while the eye was still under treatment.

So, too, in the case of Mrs. Vest, the capsule was too thick to hope for success from a needle operation, which the adhesion of the iris to the capsule rendered unsafe; for, as said above, this adhesion was complete, except for a minute space below. Atropia was useless. The tension of the ball was at least in direction of glaucoma. Left to itself, the eye was useless for the purpose of vision. Several times within the past two years it has occurred to me that in these cases of thickened capsule capsulectomy was not only justifiable, but demanded. In the case of Mrs. Vest, I thought that a further needle operation was contra-indicated, and that the best means of obtaining vision was in section and removal of a square of the capsule. This was done as follows: A *sharp* capsule knife was forced through the cornea near its upper edge and then through the anterior chamber to the iris border below. Two parallel cuts were then made in the capsule from below upwards and these cuts then joined below. Of course, the lines of incision were more or less irregular, and some tearing rather than cutting had to be done. The result was a capsular flap, attached above. No manipulation of this flap could make it give a clear pupillary space. There was some traction on the iris as shown by a minute hemorrhage at its lower pupillary margin. The tension of the ball was somewhat lowered by the escape of part of the aqueous. With a small cataract knife a corneal section 3 *mm* in length was then made along the upper corneal edge. A pair of iris forceps was then introduced through this wound and the floating flap was seized. I intended to cut this flap off with a pair of scissors should there be any traction in the iris. It, however, came away without trouble. The escape of vitreous was not more than a drop. The flap was 4 *mm* long, 2 *mm* broad, and there resulted a correspondingly large, clear, black pupil. The eye healed without complication. June 4, 1893, V = $\frac{1}{8}$ with a + 11 D sph. c + 2 D cyl. ox. 180°. The capsular opening remains clear; and the signs of irritation about the eye have disappeared. That the vision is not better is, I

think, to be attributed to the fact that the capsular pupil is excentric. A fringe of thickened capsule, to which the iris is adherent, protrudes everywhere beyond the edge of the iris. The nerve can be seen and is apparently in good condition.

This operation of capsulectomy is, I think, justifiable not only in cases, like the above, where the iris is everywhere adherent, as far as can be seen, to a thickened capsule; but also in those cases where, following extraction, the capsule is much thickened, the iris remaining free.

D-0.50

D-0.75

COO	LEE	OLD	ELF
FEE	COD	LET	TOD
ODD	EEL	TOO	OFF
ELL	DOT	FOE	COT

D-1.00

LEET	COLT	LOFT
FOLD	FEED	DELL
TOLL	TOLD	FOOL
DOLE	FELL	FLOE

D-1.50

CODE	DOLT
FLED	LOOT
COLD	DOLL

D-2.00

FED	LOO
ODE	TOE
LOT	OFT

A NEW SERIES OF TEST-WORDS FOR THE DETERMINATION OF THE POWER OF ACCOMMODATION.

By CHARLES A. OLIVER, M.D.,

ONE OF THE ATTENDING SURGEONS TO WILLS' EYE HOSPITAL, ONE OF THE OPHTHALMIC SURGEONS TO THE PRESBYTERIAN HOSPITAL, AND CONSULTING OPHTHALMIC SURGEON TO ST. AGNES' HOSPITAL, PHILADELPHIA, PA., ETC.

(*With a specimen-sheet appended.*)

THE accompanying sheet of test-words possesses the following advantages:

1. Each word is composed of three or four letters that are constructed in strict conformity with the Snellen basis of letter formation, thus not only avoiding any errors that might arise from improper characterization, but actually placing the results upon the same basis as those that are obtained during testing for distant vision.[1]

2. Each column of words, just as in the rows of test-types for distance, has a purposive succession of test-words that are alternately composed, as much as possible, of letters that are preponderant in horizontal and vertical strokes, and in curved ones, thus allowing the tests to be of great value in the ready recognition of astigmatism.

3. Each grouping of letters is composed of a different series of words which bear no relation to one another, thus preventing any power of memorizing, and any imperfections in result that might arise from context.

4. Each test-letter, just as in the larger series, is surrounded by a free space which is either equal to or greater

[1] *Vide* p. 200 of these ARCHIVES, April, 1893.

than the area that is occupied by the letter itself, thus greatly obviating any confusion that might arise from interference of one letter with its fellow.

5. Each grouping of test-words, which has been made sufficiently great so as to allow an adequate change of choice of selection during testing, is graded to a size that permits of easy and quick computation.

6. The letter-surface of the card is surrounded by a broad raised border of rough gray cardboard, thus in great measure preventing the print from being soiled by handling or by contact with any dirty surface.

Copies of this card can be obtained from Mr. William S. Yarnall, of 1406 Chestnut Street, Philadelphia, Penna., who has kindly superintended their construction.

MOVEMENTS OF THE UPPER EYELID ASSOCIATED WITH LATERAL MOVEMENTS OF THE EYEBALL.

By Dr. HARRY FRIEDENWALD, Baltimore.

Lecturer on Ophthalmology and Otology, College of Physicians and Surgeons.

SYNCHRONOUS or associated movements of the upper eyelids have recently attracted much attention. Numerous observations have been published of lid movements associated with movements of the jaw or with the act of swallowing.

Another form of associated lid movement has lately been described by Fuchs.[1] In this form the lid rises or droops when the eyes are moved laterally. Fuchs found but three cases hitherto published in which similar associated movements were observed. In five of his own cases the upper lid was raised when the corresponding eye was adducted, and in three the same lid movement occurred during abduction of the eye. He cites the case of Browning,[2] which belongs to the former variety, and the two cases (brothers) of Phillipps,[3] belonging to the latter. These are the only cases recorded in which such observations have been described. In this paper I shall describe two cases which have come under my observation. Both belong to the second variety of the associated movements just mentioned.

Case I.—Miss S. W., æt. eleven, came to my office July 6, 1891, complaining of slight asthenopia. The right eye appeared normal, but the left was smaller and lay deeper in the orbit. The examination with the ophthalmoscope showed that both eyes

[1] *Beiträge zur Augenheilk.*, ed. by Deutschmann, vol. ii., No. 11, p. 12.
[2] *Transac. of the Ophthalm. Soc. of the United Kingdom*, 1890, p. 187.
[3] *Transac. of the Ophthalm. Soc. of the United Kingdom*, 1887, p. 306.

were healthy. V R. E. with + 0.5 D cyl. ax. vertical $\frac{8}{8}$ almost, V. L. E. $\frac{8}{18}$, not to be improved with glasses. Besides this it was found that the movements of the left eye toward the nose were somewhat restricted, but that there was almost complete paralysis of the external rectus muscle. In testing these movements of the eyeball, the synchronous movements of the upper lid attracted my attention. When the eyes are directed forward the left palpebral fissure is 2 – 3 *mm* narrower than the right. When the attempt is made to look to the left, the left upper lid is raised so much that the palpebral fissure is as large as on the right side. If the eyes are turned to the right, the left palpebral fissure becomes very narrow. The difference in the palpebral fissure in the two extreme lateral positions of the eyes is very great. This patient had binocular vision when the eyes were directed forwards. It was ascertained by the test with cylindrical glasses as suggested by Lippincott.[1]

I have recently succeeded in securing a second and more careful examination (July 30, 1893), and I find my observations of two years ago almost unchanged. When the patient looks directly forward the right palpebral fissure measures 11 *mm* vertically, the left 7 *mm*. On looking to the right, the latter only measures 4 to 5 *mm*, while the former remains the same; but on directing her vision to the left, the left eyeball remains stationary in the median line and the lid is raised as high as on the healthy side. There is slight convergent strabismus when she looks directly forward (10°). This is a marked change since the first examination. When her left eye is used alone she can adduct it to 40° (measured on the perimeter), but when both eyes are open and the attempt is made to look in the same direction, the left eye is adducted but slightly and is turned upwards or downwards according to whether the plane of vision is slightly above or below the horizontal. When the left eye fixates the palpebral fissure widens, and when she attempts to abduct the eye the fissure enlarges sufficiently to expose sclerotica, above and below the cornea. If the eye is then adducted to the greatest possible extent, the eyelids almost close. There is no apparent effort at convergence, and the left lid remains stationary when the eyes are directed from a distant object to a near one. The left upper lid follows the upward and downward movements

[1] See Lippincott, "New Tests for Binocular Vision," *N. Y. Med. Journ.*, 1890, and my paper "Binocular Metamorphopsia Produced by Correcting Glasses," these ARCHIVES, vol. xxi., No. 2, 1892, p. 211.

of the eyeball in a normal manner. The pupil does not change during the lateral movements of the eye. The vision of the left eye can be raised from $\frac{8}{18}$ to $\frac{8}{12}$ by + 0.5 Ds = + 0.75 D cyl. ax. 30°n. The field of vision is normal. The test for binocular vision is successful only when the object is held a little to the right. No diplopia can be discovered in any part of the field.

In this case the ocular paralysis was congenital according to the statement of her relatives, and this is substantiated by the fact that the patient has an undeveloped eye and orbit.

CASE 2.—B. C., æt. seventeen (female, white), was treated at the City Hospital Dispensary during May, 1893, for vascular keratitis of the right eye due to granular conjunctivitis (limited to this eye). I noted complete paralysis of the left external rectus with very slight convergent strabismus (not more than 5° or 10°) when looking directly forward. The vision of the right eye was somewhat impaired on account of the corneal opacities, but the eye was otherwise healthy. The examination of the left eye with the ophthalmoscope showed no abnormality excepting a high degree of astigmatism. This accounted sufficiently for the diminished vision of this eye ($\frac{6}{60}$). Diplopia could not be produced in any way, either when looking forward or laterally. For this reason it was remarkable that the patient had the habit of turning her head a little to the left when looking at an object; her eyes were thus directed somewhat to the right—evidently in the interest of binocular vision.

When the patient's eyes are directed forwards, the left eye is slightly wider open than the right. The right upper lid touches the margin of the pupil; in the left eye about $\frac{1}{2}$ *mm* of iris is exposed between the margin of the pupil and the edge of the upper lid. The right palpebral fissure does not vary during the lateral movements of the eyeball, but the left changes considerably. When eyes are moved to the right or when the eyes are converged (adduction of the left eye), the upper lid falls about 2 *mm*—so that the pupil is half covered and the palpebral fissure is much smaller than on the right side. On moving the eyes to the left (the left eye does not move beyond the median line), the left palpebral fissure becomes so wide that about 1 *mm* of sclerotica is exposed above the cornea. Similar lid movements occur when the eyes are moved laterally, either in an elevated or in a lowered plane of vision. No pupillary changes were visible during these movements.

In this case likewise I believe that the affection is congenital. The patient has no diplopia, and does not remember ever to have had it. There is no secondary contraction of the antagonist —the internal rectus, a peculiarity of congenital paralyses.

It would be difficult to decide whether the paralysis in the two cases just related is nuclear or not.

Fuchs' cases, in which the lid was raised in abduction of the eyeball, are as follows:

1. Male, twenty-nine years; ocular movements normal. On looking directly forward no difference is noticeable in the palpebral opening on both sides, but when the right eye is adducted the eyelid droops. The affection was probably congenital.

2. Male, forty-five, syphilitic. Right eye: Slight ptosis and paresis of the internal rectus, pupil dilated, and the accommodation paralyzed. This condition disappeared under treatment with potassium iodide, but at the same time the like affections appeared in the left eye. It was then that the left upper eyelid showed the associated movements under consideration,—it was raised in abduction of the eye, but drooped in adduction. A year afterwards the ptosis had entirely disappeared, and likewise the associated movement. There was absolute paralysis of convergence (though the lateral movements were normal), the pupils were unequal and stationary, and there was paralysis of the accommodation.

3. Female, æt. twenty. Paresis of the external recti muscles, especially of the right, and slight ptosis of both upper eyelids, slightest on the left side. (The ptosis on the left side soon disappeared.) In looking to the right, the eyelids remain in the same position, but in looking to the left the eyelids fall 2 *mm.* In convergence or when the eyes are raised or lowered, there are no peculiar movements of the eyelids. In this case there was relaxation of the right lid in adduction, and of the left in abduction.

Now all of these cases differ markedly from those I described. In the first there was no ocular paralysis, a prominent feature in both of mine. In the second there was paralysis—but of the *internal* rectus, and ptosis; these symptoms, however, occurred during adult life—and were not congenital. The third case had paresis of both external recti muscles, but while the right lid drooped in adduction,

the left drooped in abduction. In the case of Phillipps, quoted by Fuchs (see above), the affection occurred in two brothers, aged seven and three years respectively, and was bilateral in both. There is no mention of any ocular paralysis.

A careful study of these cases shows that the peculiar associated movement under consideration may occur in a variety of conditions—without any paralysis or with paralysis of the external or of the internal rectus,—and that it may be congenital or acquired.

For the sake of completeness I shall refer briefly to Fuchs' cases in which an associated movement existed, opposite in kind to the form we have considered. In these cases the upper lid was raised during adduction of the eyeball. His five patients were all adults. In one only was the affection congenital. All had ocular paralysis (probably nuclear); three had paralysis of all the ocular muscles, one of the superior rectus and levator palpebræ, one of the superior and internal rectus with slight paresis of the inferior rectus). In three of the cases the contraction of the paretic upper lid was so great during adduction of the eye that it rose higher than on the healthy side. Two of the cases showed contraction of the pupil during adduction, and in one there were interesting rhythmic associated movements of the lid and pupil. To these cases we must add the last one of Fuchs' mentioned under the former head of associated movements, in which the right lid relaxed in adduction, while the *left relaxed in abduction*, and also the case of Browning referred to by Fuchs, in which there was a congenital associated movement in both lids—each was raised whenever the internal rectus of the same side contracted. As in the foregoing variety, it is seen that these likewise occur in a variety of conditions.

The associated movements which have been described belong, as Fuchs has already stated, to the same category as those involuntary movements which occur in paralyses of the extremities.[1] The excessive nerve energy which is ap-

[1] Excepting, perhaps, such cases as Browning's, which, according to Fuchs, may be considered physiological.

plied to the paralyzed nerve overflows into another channel. Fuchs calls attention to the fact that this must occur in the nuclear centres of the ocular nerves, for if it occurred in higher centres the impulse would be directed to both eyes.

In conclusion the various forms of associated movements of the lids may be stated.

1. Contraction of the orbicularis associated with movements of the jaw or the contraction of various facial muscles (after facial paralysis).

2. Contraction of the levator palpebræ superioris associated with the act of moving the jaw or of swallowing; and,

3. Contraction of the levator associated either with abduction or with adduction of the eyeball.

ON ORBITAL LOWER-LID CYSTS WITH MICROPHTHALMUS OR ANOPHTHALMUS.

By Dr. J. MITVALSKY,

LECTURER ON OPHTHALMOLOGY IN THE IMPERIAL BOHEMIAN UNIVERSITY IN PRAGUE, AUSTRIA.

Translated by Dr. Ward A. Holden.

(*With Plates VI. and VII. of Vol. XXV. of German Edition.*)

HAVING made a detailed histological examination of a case of this sort I believe I am able to offer an explanation—probably the only correct one—of the pathogenesis of the affection.

The cases previously reported are as follows:

1. Arlt[1] was the first to call attention to this congenital anomaly. In his case, an infant of nine months, the lids were present and between them a conjunctival sac, in the depth of which a small projecting body could be seen in each orbit. Each lower lid was pressed forward by a large, dark blue transparent cyst. Arlt explained the case as one of coloboma of the iris and choroid with the formation of a large diverticulum by the bulging of the ocular coats inferiorly, the eyeball proper remaining of rudimentary size. When examined after the death of the infant the suppositions of Arlt were in the main confirmed. The six ocular muscles were found and the optic nerve with a vesicle 2.5 *cm* in diameter adherent to it. This cyst, which was filled with albuminous fluid, showed near the insertion of the optic nerve a rudimentary lens in an opaque capsule. and also elements of the choroid and retina, while no trace of vitreous, iris, or cornea could be discovered.

2. Wallmann[3] reported a typical case in a child of four years. The lower lids were prominent from the presence of a cystic tumor. The ball was transformed into an irregular vesicle provided with six muscles, and thickened near the optic nerve, where lay partially imbedded a round lens 3 *mm* in diameter. The cavity of the vesicle communicated in each eye with a bulged portion of the ocular coats having smaller secondary diverticula. Near the optic nerve, retinal and choroidal elements were found. Since these elements were also found in the diverticula, Wallmann distinguished true and false diverticula, the former being made up of all three ocular coats, and in the latter the inner coats being wanting.

3. In 1863 Arlt[3] examined clinically another typical case in an infant of nine months, where both eyes were similarly affected, a small hard spot being felt in the depths of the conjunctival sac. The father had marked microphthalmus with coloboma of the iris—left, and coloboma of the optic nerve and choroid—right; the left half of the face being less developed.

4. De Wecker[4] observed an infant of six months with prominent bluish lower lids. No ball could be felt. The aspirated contents of the cysts were found to be similar in composition to the aqueous humor.

5. Chlapowski[5] observed a cyst in the orbit of a boy of sixteen. No ball could be found though the mother stated that she had previously seen a white object in the orbit about 2 lines in diameter. The cyst was extirpated. In the operation some hard object was cut through which Chlapowski took to be the optic nerve. He believed that a bulging of the anterior pole of the cyst represented the cornea. When the patient was discharged a small white spot was found in the depth of the conjunctival sac the nature of which was uncertain. The case, inaccurately described, was considered probably an atheromatous cyst,and led to great confusion in the further study of this malformation.

We come now to the eight cases described by Talko.[6]

6. A suckling; the right eye the size of a hazel-nut; left, a large orbital lower-lid cyst.

7. A child of ten; in the depth of the right orbit a small eyeball with an orbital lower-lid cyst; complete blindness; the left eyeball the size of a nut, and able to distinguish objects.

8. A girl of twelve months; both eyeballs very small, nystagmus, total blindness. A blue cyst covered with conjunctiva in the orbit, from which a yellow serous fluid escaped after incision.

9. Anophthalmia duplex congenita, a blue cyst beneath the lower lid in a girl of ten.

10. Talko's[7] fifth case was an infant of four months, with bilateral orbital lower-lid cysts, and small ovoid eyeballs with a round, transparent cornea in the depth of the orbit. The anterior portion of the cyst wall was excised, and a sound introduced into the cavity convinced Talko that the cyst did not communicate with the cavity or with the eyeball. The inner surface of the excised portion of the cyst was lined with pointed cylindrical epithelium. Talko believed that these were not malformed eyeballs, as he had previously stated, but vesicles which had nothing in common with the eye.

11. Talko's[8] sixth case was an infant of nine months, with a small eyeball in the right orbit.

12. Talko's[8] seventh case was an infant of nine months, with a small eyeball in the right orbit, and in the left a marked microphthalmus with coloboma of the iris.

13. Talko's[10] last case was a woman of forty-two, with a small body in the depth of the right orbit, which moved synergetically with the left eyeball. This rudimentary ball was united with the cyst.

14. Imre[11] reported a case of bilateral cyst with microphthalmic balls.

15. Bayer's[12] case was a female child with a cyst in the right orbit, after the puncture of which a small eyeball, with a cornea 3 *mm* in diameter, appeared.

16. Berlin[13] reported a unilateral case with apparent anophthalmus. A younger child of the same family showed a bilateral microphthalmus without cystic formations.

17. Wicherkiewicz[14] described a case of bilateral anophthalmus, with cysts, in an infant of two months.

18, 19. Manz,[16] in a paper written in 1880, described cases of orbital cysts, which, as he believed, belonged to a new variety. His first case was that of a young peasant who in place of an eyeball had a large tumor, which had distended the orbit. This cyst, with the adherent microphthalmic eye, was excised in two fragments.

Another specimen examined by Manz showed a microphthalmic ball with a cyst near the nerve entrance, composed of scleral layers lined with choroid, no retinal elements being found.

Manz's explanation is as follows: A scleral cyst may become greatly enlarged, and may also be cut off from the ball so that the former communication may be represented only by a fibrous cord. Or, since the inner scleral layers which rest on the choroid may probably be separated from the outer scleral layers by the increase of the cystic fluid, this dehiscence of the scleral layers may increase in every direction and include the greater portion of the ball. The cornea and optic nerve form the limits of such an extension. Manz believed that he had discovered a new mode of formation of orbital cysts in genetic conjunction with the eyeball, the other modes, that of hydrophthalmus and ectatic coloboma, being fairly well understood.

In my opinion, Manz's first case was one of orbital dermoid cyst with a microphthalmic eyeball, the development of which had been arrested at a very early stage. In the second case, the specimen was too badly preserved to permit any definite conclusions to be drawn from its examination.

20. Scerebitzky[17] reported a bilateral case in an infant of six months. There was anophthalmus and an irregular white spot in the depth of the orbit.

21. Van Duyse's[18] case was a man of twenty-two, with an orbital lower-lid cyst on the right side. The right eye appeared to be absent, but was discovered after the puncture of the cyst. The left eye showed a slight degree of microphthalmus with coloboma of the iris, choroid, and nerve sheath. The choroidal coloboma was characterized by marked secondary bulgings of the ectatic sclera. Two

younger brothers, dead in infancy, had hare-lip, and one of them cleft palate also. Van Duyse concluded that in these cases a coloboma had been transformed into a cyst (colobome encysté).

22. In Schaumberg's[19] case, an infant of six weeks, there was a cyst in the left orbit with bilateral anophthalmus; the orbits appearing to be small.

23. Dor[20] described in an infant of six months a fluctuating bluish tumor, somewhat larger than a normal eye, in the infero-internal angle of the right orbit, to which was adherent a microphthalmic eye with coloboma of the iris. After removal of the cyst, no communication was found with the eye. On the other side there was microphthalmus with coloboma of the iris and choroid. Objects were seen with this eye. Dor believed that in fœtal life a portion of the embryonic vitreous, having been cut off outside the ball by a premature closure of the fœtal cleft, had developed into a cyst. At the microscopic examination, however, no embryonic vitreous structure was found, nor an epithelial lining of the cyst, but in the tissue was a spindle-celled fascicular sarcoma.

The clinical description of this case leaves no doubt that it was one of orbital lower-lid cyst with micropthalmus.

24, 25. Snell[21] reported two cases. The first, "congenital cyst in the lower eyelid with apparent anophthalmus," was in an infant of one month. A rudimentary eyeball was discovered after puncture of the cyst. A year later the patient was seen a second time. The left incised cyst was again filled with fluid; the right cyst, which had not been disturbed, had vanished, but in the floor of the orbit was a round, non-fluctuating tumor beneath the conjunctiva, apparently either cyst or rudimentary eyeball.

His second case was an infant of six weeks, with a cyst on the left side that completely filled the orbit. The right eye was normal. After extirpation of the cyst an almost normal but very small eye was discovered. Fourteen days after the extirpation, the ball had pressed forward, and later it grew considerably, but did not reach the normal size. The eye was movable, and the child could see with it. There was a coloboma of the choroid.

26. v. Reuss's[23] first case was a child of three months, with left microphthalmus and orbital lower-lid cyst. In the other eye there was a coloboma of the nerve sheath.

27. v. Reuss's[23] second case was a girl of fifteen, with a left microphthalmus connected with the cyst by a thick cord. The right ball was somewhat small, and showed a coloboma of the iris, choroid, and nerve sheath.

28. One of the most important contributions to the subject is that of Kundrat.[24] In his case in the depth of the right orbit was a small pear-shaped eyeball, with cornea and optic nerve, and a lens nearly filling its interior. The ball was open inferiorly and its cavity connected with a gelatinous tissue which lay under it and anteriorly passed over into the lower-lid cyst. The condition on the left side was similar.

Arlt's explanation would not answer for such a case, for here there had been no closure of the fœtal cleft and no formation of a bulging scleral sac.

The left ball showed an inferior cleft 2 *mm* wide, extending to the optic nerve and bordered by the sharp margin of the sclera. The cavity was lined with apparently normal choroid and retina. The retina, much wrinkled, passed through the inferior cleft and formed a lining for the optic cavity below. All the cysts showed an outer fibrous and an inner gliomatous layer, the latter being subdivided into an outer stratum, poor in cells, and an inner, richly cellular. Between the eyeball and cysts was a finely fibrous cellular embryonic connective tissue, which passed over into the sclera and into the outer wall of the cysts. From the anterior end of the inferior cleft extended a narrow cystic cavity lined with a delicate cylindrical epithelium.

From this it appears that, in the genesis of these cysts, the retinal tissue, *i. e.*, the tissue of the primary optic vesicle, pushing through the open fœtal cleft into the embryonic tissues outside, is enclosed and cut off by the latter, thus forming a cyst. Kundrat believes he is correct in supposing the basis of this embryonic tissue to be the mesodermic tissue, which should have formed the poorly developed vitreous. He believes further that the check in

the development of the vitreous and in the closure of the fœtal cleft is primary, and that the proliferation of retinal tissue—not its simple bulging out—is secondary.

Kundrat's view is in the main correct, and is, up to the present, the only proven genesis of these cysts, but many of the details are not clear, and his employment of the expression "fœtal cleft" is ambiguous.

29. Ewetzky[35] observed an infant of eighteen months having this anomaly. After emptying the contents of the cyst, a solid cord with a distended end was found—probably the rudiment of the ball. A portion of the cyst wall was examined histologically. It was found to be made up of two layers, the outer consisting of connective-tissue bundles, while the inner was thinner and richer in cells. In other parts a single stratum of cylindrical epithelial cells was found, but here no traces of the tissues described could be seen, and the epithelium rested directly on the outer layer of the wall, and here and there was directly continuous with the finely fibred tissue of the inner layer. It was thus evident that the epithelium and the inner cellular, finely fibred layer were analogous formations.

Ewetzky took the inner layer of the cyst wall to be the undeveloped and altered retina, and the epithelium the pars ciliaris retinæ; the cyst representing then a cut-off coloboma. The outer layer of the cyst wall is to be regarded as a formation analogous to the choroid and sclera, the grouping of the large vessels resembling that of the choroid, and the direction of the connective-tissue bundles recalling that of the sclera. He agreed with Arlt as to the genesis of the affection, and introduced the word "coloboma cyst."

30. Radziszewski[36] in an infant of two months found bilateral anophthalmus with orbital lower-lid cysts. He considered the anomaly a double encephalocele, but was not positive in his diagnosis.

31. Panas[37] extirpated a bilocular orbital lower-lid cyst in a child of twelve years, it not being stated whether the ball was normal or not. The larger cystic cavity was lined with a stratified cylindrical epithelium, while the smaller cavity showed a modified epithelial lining. Panas believed that

the case was one of fœtal involution of the mucous membrane of the nose and accessory cavities.

32. Tillaux [28] saw a unilateral case of this affection in a young man, where the microphthalmic ball was displaced upward by the cyst. According to Tillaux these cysts should be considered diverticula of the sclera according to Manz's view.

33. Ernrot [29] reported the case of an infant of five weeks with bilateral anophthalmus.

34. Max Mayer [30] found this anomaly on the right side in an infant of three weeks. The wall of the cyst was composed of connective tissue, and lined with a single stratum of high epithelial cells. Mayer regarded the connective-tissue wall as the thinned and altered sclera, the epithelium as the analogue of the retina.

35. Lang [31] found the anomaly on the left side in a child of three years. The cyst passed from the inferior surface of the ball and optic nerve, its walls being in unbroken connection with the posterior portion of the sclera and the sheath of the optic nerve. In the ball a brown layer rested on the sclera, and within this a darker pigmented layer, the pigment epithelium of the retina, which latter extended into the neck of the cyst. The portion of the ball adjoining the cyst contained a substance similar to cerebral cortex, in direct continuation with a gelatinous mass. This substance consisted of a network of fine fibres, cells with processes, and scattered nuclei, and resembled retinal tissue. All the layers of the cornea and iris were present, the latter having an inferior coloboma. Lang offered the theory that the cyst had arisen from the primary optic vesicle which had pushed out into the mesodermic tissue of the vitreous.

36. Rubinski [32] described a case in an infant of six months. In the right orbit was a very small eyeball. The left eye was somewhat microphthalmic with coloboma of the iris and choroid. There was no communication between the cavity of the cyst and that of the ball. The outer layer of the cyst was a tissue, poor in nuclei, with a network of vessels, and some fatty material. The inner layer was rich in nuclei and bore a faint resemblance to the retina, it being reversed, however, and the rods and cones pointed inward.

Rubinski, in spite of his careful histological examination, held to the theory of Arlt and rejected that of Kundrat.

37. Czermak's [33] case was of an infant of twelve days with a left-sided affection, the right eye being normal. The cyst wall was composed of two layers, an outer of connective tissue and an inner consisting of retinal elements in reversed position. This arrangement must be due to the development of a portion of the primary optic vesicle which has not undergone involution.

38. The last case in the literature is that of Lapersonne,[34] an infant of five weeks with a bilateral affection. Both optic nerves ended in two fibrous bodies representing rudimentary balls, and were continued inferiorly and anteriorly in orbital lower-lid cysts. The cysts here were lined with a structure resembling a reversed retina thrown into numerous folds. It is difficult to understand by what mechanism the distal layer of the primary vesicle may become almost entirely invaginated and leave but a small portion outside the ball. Furthermore the presence of a lens in the rudimentary ball indicates that the pathological changes must have begun at a late period.

The cyst cavity and that of the ball may communicate freely, or the communication may be narrow, or they may be joined only by a connective-tissue cord, in which case, nevertheless, retinal elements may be found in the cyst. In these different cases it would appear that the malformation had developed before the closure of the fœtal cleft, and the retina might then readily extend outward. To a much later developmental period belong those cases where there is simply a uveal coloboma with ectasia of the choroid. The increase in this ectasia brings about the coloboma cysts of Arlt and Van Duyse (?).[1]

NEW OBSERVATIONS.

CASE 1. *Clinical Observation.*—An infant of eighteen months, with right eye normal, the left upper lid sunken, and the lower

[1] A more recent case is that of Gailemaerts (*Rev. générale d'opht.*, March, 1893). The patient's right eye was normal, the left was microphthalmic, with a large orbital lower-lid cyst. The cyst wall consisted of two layers, an outer fibrous and an inner granular, but not clearly defined. He holds to the ectatic coloboma theory.—TRANSLATOR.

protruding from the pressure of a tumor the size of a plum. The conjunctiva on the upper surface of the tumor has no tarsus, and may be readily drawn away from the tumor. The tumor has a bluish color and the appearance of a very thin-walled cyst. The orbicularis muscle has its proper function in the upper lid only. Two *cm* from the margin of the lower lid a thickening of the conjunctiva is felt, 1 *cm* in extent, and adherent to the upper posterior wall of the cyst. When the normal right eye is moved synchronous movements of this thickened mass may be felt. A bluish white spot seems to represent the cornea of a rudimentary eyeball. The orbit presents no other abnormalities. The lachrymal apparatus is normal.

In this case there could be no doubt but that there was a malformation of the contents of the orbit, consisting in the arrested development of the ball, which remained a nodular mass, and in the formation of a serous orbital cyst, which occupied the inferior portion of the orbit and grew outward, pushing the lower lid before it.

CASE 2. *Clinical and Histological Examination.*—An infant of eleven months, well developed, without hereditary vices, had a normal right eye. The palpebral fissure of the left eye (Fig. 1) is lengthened to 3.5 *cm*, the outer canthus standing higher than the inner. The upper lid is sunken, the lower displaced forward and upward. The orbicularis functionates only in the upper lid. Lachrymal apparatus normal. Orbit distended at the cost of the inferior wall. The cyst extends from the inner canthus 1 *cm* beyond the external canthus, and has a shallow furrow on its surface. In the depth of the orbit is a body 1.5 *cm* in diameter covered with conjunctiva, and moving with the normal eye.

The cyst and rudimentary ball were extirpated, hardened in alcohol, and cut in serial sections in the antero-posterior direction of the orbit.

Microscopic.—The rudimentary ball which lay obliquely in the distended orbit, the optic nerve inward and the cornea outward, consists externally of a typical sclerotic coat 3 *mm* thick. Anteriorly it presents a cornea (Fig. 8, *a*), and this portion of the rudimentary ball most nearly resembles the normal. The opaque cornea, about 3 *mm* in diameter, has a modified epithelium, a stroma with parenchyma-

tous infiltration, a typical membrane of Descemet, with a rudimentary ligamentum pectinatum and canal of Schlemm. The iris and ciliary body are fairly developed, the former being imperforate, and there is an anterior chamber (Fig. 8, *c*).

Inferiorly the sclerotic coat is open, and its fibres, continuing downward in parallel bundles from the entire extent of the ball, form a sac-like diverticulum, separated, however, from the orbital cyst by intervening fatty tissue. Where the scleral tissue passes over into the fibrous wall of the sac there is on each side in the entire length of the ball a mass of cartilage (see Figs. 2 and 3).

The posterior surface of the iris is covered with a single stratum of darkly pigmented epithelium—the pars ciliaris retinæ,—which also covers the projections and depressions of the ciliary region, and then gradually losing its pigment passes over into a typical unpigmented cylindrical epithelium covering the lateral and superior walls of the sac-like diverticulum, and then continues in a gliomatous cellular layer over the floor of the diverticulum.

The pigment epithelium of the posterior ciliary region is interrupted for a distance, and protruding through this break, yet for the most part lying in the sclera, is a rudimentary lens of hour-glass shape (Fig. 8, *f*).

As the sections pass back through the cornea the diverticulum beneath the ball does not appear, and its fibrous wall passes over into the fibrous outer wall of the orbital lower-lid cyst, it thus being evident that the outer wall of the cyst is the direct continuation of the sclerotic coat of the ball.

Now between the rudimentary ball and the cavity of the orbital lower-lid cyst we find an intercalated tissue, with many clefts and elevations, which represents an incomplete and anomalous development of the distal layer of the primary optic vesicle from which the retina normally arises (Fig. 6, about *h* and *k*). This layer of tissue rests in an inverted position on the intervening fibrous tracts. This intercalated tissue is, by the medium of the unpigmented cylindrical epithelium layer, directly continuous with the single stratum of pigment epithelium covering the ciliary region and lining

the cavity of the ball, outside which pigment epithelium a typical choroid has developed.

The retinal element in this intercalated tissue, the outgrowth of the cyst wall, is inverted and altered, but easily recognizable (Fig. 7). The nerve-fibre layer rests on the fibrous supporting tracts, while the surface which normally rests on the pigment epithelium here lies free, bordering the sinuous cavities, and presenting a limitans beyond which here and there are seen rods and cones. The supporting framework of the optic nerve, including some nerve fibres, passes directly into the tissues resting on the fibrous tracts. The central portion of these fibrous tracts contains large nutrient blood-vessels.

The ciliary body at two points has pushed out and united forming a septum, which has become adherent to the distal wall of the ball, dividing its cavity into two. At some points the intercalated tissue rests on the posterior surface of this septum, being cut off altogether from the cavity of the ball (Fig. 6). At other points there is a small communication between the cavity of the ball and the clefts and spaces of the intercalated tissue. In other sections a communication may be found between the cavities of the intercalated tissue and the cyst cavity, indicating that all these cavities have freely communicated originally. The upper free portion of the cavity in the intercalated tissue continues into the coloboma of the nerve sheath. The intercalated tissue ends here and further inward appears shut in the solid fibrous cord connecting the scleral wall of the ball with the cyst wall, but projects out cone-shaped into the cyst cavity (Fig. 3, *h*).

The inner wall of the cyst has arisen from the retina. The pathological changes it presents may be referred to a diffuse interstitial retinal inflammation which has caused atrophy of all the nervous elements and proliferation of the supporting framework.

THE GENESIS OF THE CYSTS AND THE MICRO- OR ANOPHTHALMUS.

The cavity of the ball, which would otherwise have been open inferiorly, was found to be partially closed by the pro-

liferation of the ciliary body. The spoon-shaped ball open inferiorly may all be considered as developed from the proximal layer of the primary optic vesicle. This layer produced first in the usual way the single stratum of pigment epithelium. The bordering mesoblast then proceeded to the formation of a choroid and a fairly typical sclera. Anteriorly there developed later the cornea and iris.

In this entire region, however, we find no products of the distal layer of the primary vesicle, which as is known produces the retina proper, the pars ciliaris retinæ, and the pars retinalis iridis. All these products are found, however, hanging to the rudiment of the ball, surrounded by a fibrous wall, which from the absence of a choroid has not developed into a typical sclera, and which also encloses a large orbital lower-lid cyst. The space in which these products of the distal layer are deposited is our intercalary space, and the products themselves make up our intercalated tissue.

In the ciliary region at the margin of the ball is a partially pigmented single stratum of cylindrical epithelium, which passes over into a higher unpigmented epithelium, which latter in its turn passes through a gliomatous tissue into the inverted and transformed retina. The single stratum of epithelium in its pigmented portion represents the pars retinalis iridis, and in its unpigmented portion the pars ciliaris retinæ.

These relations can only be explained by supposing the distal layer of the primary optic vesicle to have retained its original position. That no invagination occurred to form the secondary optic vesicle is shown by the absence of the lens from the interior of the ball. The scarcely recognizable rudiment of the lens has merely broken through the distal wall of the vesicle without invaginating it. Whether this has played any rôle in arresting the development of the eye is not clear.

With the development of the coats of the eye went hand in hand the secretion of the ocular fluid by the well developed retinal epithelium, and the current took the direction of least resistance, and passed into the folded products of the distal layer developing in the neighboring mesoblast, and distending them. And when a fibrous sheath had formed

about these products, preventing their uniform distension, the weaker portions of this sheath yielded, and a large reservoir was formed, preventing the proper development of the inferior orbital wall and eventually pushing out into the lower lid. This increasing distension of the cyst affected the retinal lining and a diffuse inflammation occurred, with the results noted above.

The question now arises, can all the known cases of this malformation be explained in this manner. I believe that they may, with one modification consisting in the possibility of a partial involution of the primary optic vesicle.

Since we claim that this anomaly develops from the primary optic vesicle, we must have facts to show that there has been no involution of the primary vesicle, and that it has retained its original relation to the surrounding mesoblast. The simplest proof of this is the inverted position of the retina which has been found in every case examined. The lens or its rudiment cannot lie within the ball but must be in the connective-tissue coat, if there has been no involution of the vesicle. Nor can such a ball contain a retina in its normal relation to the pigment epithelium.

There are, however, cases of this malformation where the lens lies in the interior of the eye, andwhere there may perhaps be a retina of normal structure and position, the partially developed ball being in connection with cysts. In these cases we may suppose the distal wall of the primary vesicle to have become involuted in its anterior portion, forming a normal retina, while nearer the optic nerve it has not become involuted and this portion becomes distended, forming a cyst. In this manner we may explain the cases in which there is a cyst near the optic nerve of a ball that is fairly well developed.

In conclusion I would mention those malformations which may be called transition cases. These are such as are observed at a stage when the cyst has not reached any great development, and the lower lid is not protruding, and the cyst is found only when the orbital contents are examined anatomically. The cysts may be of any size. Usually, however, they are well marked at birth.

My thanks are due to Professor Schöbl, director of the Imperial Bohemian University Eye Clinic, for having granted me the clinical material used.

LITERATURE.

1. *Zeitschrift der h. k. Gesellschaft der Aerzte zu Wien*, 1858, p. 445, 446.
2. *Ibidem*, S. 446, 447.
3. *Wiener medicinische Presse*, 1885, S. 245, etc.
4. *Klinische Monatsbl. für Augenheilkunde*, xiv. Jahrg., 1876, S. 329, etc.
5. *Pamietnik drugiego zjazdu lekarzy i przyrodników polskich we Lwowie* (19.–24. Lipca 1875r). We Lwowie, 1876. (Torbiel oczodotowy wrodzony, potaczony z zupetnym brakiem gatkioczowéj.)
6. *Klin. Monatsbl. f. Augenheilkunde*, xv. Jahrg., 1877, S. 141.
7. *Ibidem*, S. 137–140.
8. *Bericht über die zwölfte Versammlung der ophthalmol. Gesellschaft*, Heidelberg, 1879, S. 105–114.
9. *Compte rendu du Congrès période. internation. d'opht.*, Milan, 1880, and *Annales d'Oculistique*, Tome lxxxiv., S. 159.
10. *Przeglad lekarski*, Nr. 51, 1889.
11. *Szemészet*, 1878, Nr. 3 ; from Nagel's *Jahresbericht*, ix., S. 196.
12. *Aerzlicher Bericht des k. k. allgem. Krankenhauses zu Prag f. d. J.* 1879, S. 288. Prag, 1880.
13. *Gräfe-Sämisch*, Bd. vi., 1880, S. 686.
14. *Klin. Monatsbl. f. Augenheilkunde*, 1889, xviii. Jahrg., i. Abtheil., S. 154, etc.
15. "Zwei Fälle von Mikrophthalmus congen. nebst Bemerkungen über die cystoide Degeneration des fötalen Bulbus." *v. Gräfe's Archiv*, xxvi. Jahrg., i. Abtheil., S. 154, etc.
16. *Dieses Archiv*, Bd. xxiii.
17. *Klin. Monatsbl. f. Augenheilk.*, 1881, xiv. Jahrg., S. 423, etc.
18. *Annales d'Oculistique*, 1881, Tome lxxxvi., S. 144, etc.
19. "Casuistischer Beitrag zu d. Missbild. des Auges." *Diss.* Marburg, 1882.
20. *Revue générale d'Ophtalm.*, 1882, Nro. 2, S. 81, 82.
21. *Transactions of the Ophthalm. Soc. of the Unit. Kingdom*, vol. iv., S. 333, etc., 1884.
22. *Wiener medic. Presse*, 1885, Nro. 6.
23. *Ophthalmologische Mittheilungen*, ii. Abtheil., Wien, 1886.
24. *Wiener medicinische Blätter*, 1885, Nr. 51, 52, and 1886, Nro. 3.
25. "Beitrag zur Kenntniss der Colobomcysten." *Inaug.-Diss.*, Moskau, 1886.
26. *Progrès méd.*, xiv., 32, 1886, from Schmidt's *Jahrb.*, Bd. 212, S. 294.
27. *Archives d'Ophtalm.*, tome vii., S. 1–12.
28. *Recueil d'Ophtalm.*, 1888, S. 1, etc., from a review in *Archives d'Ophtalmologie*, Bd. viii., S. 178, etc.
29. *Wratsch*, 1888, Nro. 7, S. 134.
30. "Mikrophthalmus mit Cysten im unteren Augenlid." *Inaug.-Diss.*, 1888, Würzburg.

31. *The Royal London Ophth. Hosp. Rep.*, Part iv., Bd. xii., 1889. (Not accessible to me in the original.)

32. "Beitrag zu der Lehre von den angeborenen Cysten des unteren Augenlides mit Microphthalmus (Colobomcysten)." *Inaug.-Diss.*, 1890, Königsberg.

33. *Wiener klin. Wochenschrift*, No. 27, 1891.

34. *Archives d'Ophtalm.*, Mai-Juin, 1891.

35. Hirschberg's *Centralblatt f. pr. Aug.*, 1891., August.

Explanation of the Figures.

FIG. 1.—A sketch of the second case.

FIG. 2.—(*a*) scleral tissue, (*b*) the posterior layer of the choroid, (*c*) the obliquely cut optic nerve, (*d*) the posterior portion of the nerve-sheath coloboma, (*e*) the two cartilaginous masses, (*f*) the out-growth from the cyst wall.

FIG. 3.—(*a*) scleral tissue, (*b*) typical choroid, (*c*) oblique section of optic nerve, (*d*) nerve coloboma, (*e*) the two cartilaginous foci, (*f*) the cavity of the ball, (*g*) the septum between the nerve coloboma and the cavity of the ball, (*h*) the outgrowth from the cyst wall, (*i*) the opening of the cavities in the intercalated tissue into the large orbital lower-lid cyst, (*k*) single stratum of pigment epithelium.

FIG. 4.—A reticular portion of the inner layer of the cyst; (*a*) the inner surface, (*b*) the outer.

FIG. 5.—A portion of the inner layer of the cyst, with pencil-formed bundles of fibres; (*a*) the inner surface, (*b*) the outer.

FIG. 6.—A section through the rudiment of the ball, where the septum is united with the upper surface of the ball cavity, dividing it into two, and the intercalated tissue is apparently united with the entire posterior surface of the septum; (*a*) sclera, (*b*) suprachoroidea, (*c*) choroid, (*d*) pigment epithelium, (*e*) ciliary body, (*f*) ciliary muscle, (*g*) the two cartilaginous foci, (*h*) the third cartilaginous focus in the intercalary cavity, (*k*) the gland-like transverse sections of the folds of cylindrical cells in the intercalated tissue, (*l*) the same in longitudinal section, (*m*) a cavity containing pigment detritus, surrounded by a fine vitreous membrane.

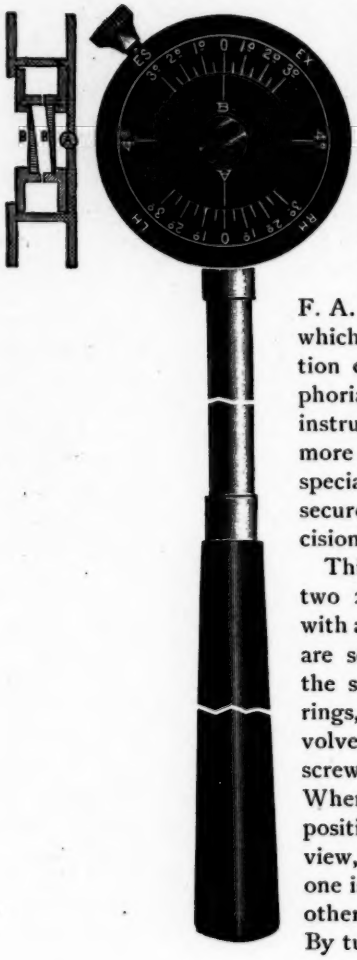
FIG. 7.—A portion of the perversely developed retina; (*a*) fibrous tract to which the retina is united by (*b*) the layer of hypertrophied Müller's fibres, (*c*) a fibro-cellular layer substituting the nerve-fibre layer, (*d*) remains of ganglion-cell layer, (*e*) inner reticular layer, (*f*) proliferated nuclear layers with (*g*) the included reticular layer replaced in the middle of the drawing by cells of the nuclear layers.

FIG. 8.—A section of the rudiment of the ball where it is completely separated from the orbital lower-lid cyst ; (*a*) the cornea, (*b*) the folds of conjunctiva, (*c*) the anterior chamber, (*d*) the remainder of the anterior portion of the ball cavity with the ciliary body, (*e*) the posterior ciliary region shows a cleft through which the rudimentary lens (*f*) protrudes, (*g*) two coloboma sacs adherent to the ball and lined with retinal elements, (*hh*) two contiguous cartilaginous foci.

FIG. 9.—The region of the rudimentary lens in Fig. 8 more magnified ; (*aa*) the ends of the perforated ciliary region, (*b*) the portion of the lens within covered with a typical capsule and epithelium, (*b'*) the portion of the lens in the scleral cleft, (*c*) longitudinal section of numerous folds and furrows of the ciliary region, covered with epithelium.

A NEW PHOROMETER.

By A. E. PRINCE, M.D., Springfield, Ill.



IN a paper read at the last meeting of the Ophthalmological Section of the American Medical Association, on "The Fourth Degree Prism in the Correction of Hyperphoria," it was suggested that an instrument was in process of manufacture by F. A. Hardy & Co., of Chicago, which would facilitate the detection of small degrees of hyperphoria. The completion of this instrument has demanded much more time than was anticipated, special tools being required to secure uniform mechanical precision.

This instrument consists of two 2-degree prisms, combined with a Maddox rod. The prisms are set as shown at "B B," in the sectional view, in revolving rings, "C C"; these rings revolve, by means of a thumb-screw, in opposite directions. When they are revolved to the position shown in the sectional view, in which the base of the one is opposite the apex of the other, they neutralize each other. By turning the thumb-screw, the

bases of the prisms rotate toward each other with a refractive effect, increasing in amount as they rotate, until the bases are exactly opposite each other, when a total strength of 4 degrees is realized.

A Maddox rod, "A," is placed back of the prisms so that they rotate in front of it.

Placing the instrument, dial forward, before the patient's right eye, with the rod vertical, the image of a small gas-jet, viewed against a dark background, at a distance of fifteen feet or more, will be distorted into a horizontal band of light. Should an error of less than four degrees exist, rotation of the thumb-screw will effect a superposition of the images. The index will point to R. H., L. H., or O., denoting the degree of right or left hyperphoria, or the existence of neither.

Similarly in observations relative to esophoria or exophoria, the instrument is held before the right eye, with the rod placed horizontally. The thumb-screw is rotated until the vertical light band seems to coincide with the flame. The index will now point to Ex., Es., or O., denoting the degree of exophoria, esophoria, or the absence of both.

In case the deviating tendency be greater than four degrees, the character of the error will be indicated by the approximation of the images. A prism of 4 degrees is now placed in a trial cell, and if insufficient, is replaced by one of 8, 12, or more degrees, until one is found, which, with the aid of the phorometer, will secure the coincidence of the images. The degree indicated is now added to that of the prism employed.

To apply a control test, the instrument may now be held before the left eye and the dial readings reversed.

This phorometer has the advantages possessed by the Maddox rod over those instruments which depend on the principle of deflection. Two entirely dissimilar images are observed which have no tendency to blend, hence they can be approximated without risk of an effort being made to secure their superposition. In small degrees of deviation, more accurate discrimination is made than is the case when

the images are of the same character, and hence, from necessity, removed to a greater or less distance from one another. The manifest error revealed by the rod more nearly corresponds with the total, though unfortunately, no method or remedy has been discovered to reach the maximum tendency by any single observation, as is the case in the mensuration of hypermetropia.

In addition, the following advantages of the phorometer over the simple Maddox rod are thought to exist:

First. It removes the possibility of preconceptions on the part of the patient.

Second. It avoids the necessity of an explanation of terms to the patient.

Third. It avoids the errors from fatigue due to delay, occasioned by the changing of prisms.

Fourth. It indicates the character of the heterophoria.

Fifth. It indicates the manifest quantity to a fraction of a degree.

Sixth. It saves the time of the observer.

Seventh. Its simplicity and inexpensiveness, together with the rapidity and accuracy with which the presence or absence of heterophoria is determined, render it of especial diagnostic value to the general practitioner or neurologist who recognizes the ætiological importance of muscular anomalies.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1892;

By Dr. ST. BERNHEIMER, in Vienna; Prof. HORSTMANN, in Berlin; and Dr. SILEX, in Berlin;

WITH THE CO-OPERATION OF

Dr. S. M. Burnett, Washington; Dr. Dantone, Rome; Prof. Hirschmann, Charkow; Dr. P. von Mittelstädt, Metz; Dr. Werner, Dublin; Dr. C. H. A. Westhoff, Amsterdam; Dr. Schiötz and Dr. Ole Bull, Christiania; Dr. Deus, Berlin; Dr. Herrnheiser, Prague; Dr. Sulzer, Geneva, and others.

Translated by Dr. Ward A. Holden.

Sections I.–V. Reviewed by Dr. St. BERNHEIMER.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

TEXT-BOOKS, MONOGRAPHS, AND TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS. STATISTICAL REPORTS.

335. Illinois Charitable Eye and Ear Infirmary. Eighteenth Report, 1891–92.

336. Albertotti. A French manuscript of the 17th century on the use of spectacles. *Man. della R. Acc. di Scienze, Lettere et Arti di Modena*, v., ix., series ii.

337. Rosmini. Report of the Ophthalmic Institute of Milan. *Boll. d'ocul.*, xiv.

338. Vossius, A. Text-book of ophthalmology, second enlarged and revised edition. Franz Deutike, Leipsic and Vienna, 1892.

339. v. FRIMMEL. Leonardo da Vinci's eye. *Repertor. f. Kunstwissenschaften*, xv., part 45, 1892.

The total number of eye patients treated in the Illinois Charitable Eye and Ear Infirmary (335), in two years, was 10,316; simple extraction was done 70 times, and Graefe's operation 129.

ALBERTOTTI (336) publishes the French translation of a treatise on the use of spectacles by the Spaniard, Daça de Valdes. The title of the original is: "Uso de los anteojos para todo genero de vistas." It was printed by Diego Perez, Seville, in the year 1623. Only seven copies of the book are in existence, six being in Spain or Portugal, and one in the British Museum. The text used by Albertotti is that of a manuscript French translation which is in the National Library in Paris. The book is of great historical value. The views of the author regarding the eye, vision, and loss of sight are those of Aristotle (the optic nerves unite in the pupil and through these the vital spirits are sent forth to objects which are to be seen . . . cataract covers the pupil, etc.).

In the second section of the book, definite rules are given for the selection of concave glasses for myopes, and for adapting convex glasses according to the years of old persons.

A remarkable fact is that the numbering of lenses as given by Daça de Valdes, and being then in use in Spain was according to the present dioptric system, many numbers differing only by a fraction from those now used. No. 1 was the weakest glass, No. 30 the strongest. No. 1 had a radius of curvature equal to the Spanish yard of that day which was 0.836 m, and thus was the equivalent of our 1.19 D. No. 30 was a segment of a sphere the size of the human eyeball and was equal to our 26 D.

DANTONE.

ROSMINI (337) in his report speaks of a case in which in the removal of an orbital tumor an abscess was opened which proceeded from the brain and which, as was shown at the autopsy, was caused by a large sarcoma. DANTONE.

The new edition of VOSSIUS' (338) book is considerably enlarged, and contains the latest investigations of others, and the author's investigations and clinical experience.

From a number of notes by Da Vinci on his vision, v. FRIMMEL (339) concludes that he was myopic. The stars appeared smaller to him when seen through a small opening than when seen with the naked eye. Two lights $\frac{1}{2}$ ell apart at a distance of 200 ells

were perceived as a single light. When observed through a pin-hole, he recognized the two.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

340. GILLET DE GRANDMONT. The microbic nature of the deep ophthalmias. *Arch. d'opht.*, xii., No. 10, p. 623.

341. TRUC. The evisceration of the ball in panophthalmitis. *Ann. d'ocul.*, cviii., p. 260.

342. LAGRANGE. The value of exenteration of the eyeball in respect to the wearing of an artificial eye. *Soc. de méd. et de chir. de Bordeaux*, July, 1892.

343. SNELLEN. Conservative therapeutics in ophthalmology. *Med. Tydschrift voor Geneeskunde*, part ii., 1892.

344. BARTKOWSKI. Contributions to the enucleation of the eye. Dissertation, Greifswald, 1889.

345. BEYER HILARIUS. Comparison between enucleation of the eye, exenteration, and excision of staphyloma, Dissertation, Greifswald, 1891.

346. v. MOLL. The local treatment of diseases of tissues that are not superficial. *Zehender's klin. Monatsbl.*, xxx., p. 329.

In a patient convalescent from typhoid fever suffering from iritis GILLET DE GRANDMONT (340) made cultures on agar-agar from the contents of the anterior chamber and obtained typhoid bacilli. Inoculations of the vitreous of a rabbit with the culture caused an inflammation which cleared up later. The rabbit which appeared to be well was killed, and the same bacillus was found in the intestines and the liver. In a second case of recurrent erysipelas with subsequent vitreous inflammation cultures on gelatine from the aqueous humor showed streptococci with the morphological character of those of erysipelas. In a third case opacities of the vitreous appeared suddenly two days after a miscarriage. Before a paracentesis had been made, the patient died of acute peritonitis. These internal ocular affections are due to infection from general disease. Paracentesis and culture experiments verify the diagnosis in doubtful cases.

v. MITTELSTÄDT.

In panophthalmitis TRUC (341) amputates the anterior segment of the ball ½ *mm* behind the corneal margin, and removes the contents of the ball with a blunt spoon. Any remaining pus or tissue is washed out with a Cenel syringe. A moist sublimate

dressing is applied, and the wound irrigated twice daily. The operation may be done under cocaine anæsthesia ; the stump so obtained gives a greater mobility to the artificial eye than the empty orbit. SULZER.

Whenever evisceration is possible LAGRANGE (342) prefers it to enucleation, since it leaves a stump that is indolent and permits greater mobility of the artificial eye. SULZER.

In the matter of conservative therapeutics SNELLEN (343) offers the following propositions : 1. An eye should not be removed for every ciliary injury. 2. In most cases of corneal ulcer the sharp spoon is of greater service than the cautery, since with it only the tissues diseased are removed. After scraping, the surface of the wound should be pencilled with tincture of iodine. 3. In glaucoma and cataract operations the iris should be spared as much as possible. WESTHOFF.

Being convinced that therapeutic agents applied to the surface have little effect on the deeper structures of the eye, and that general treatment is often insufficient, v. MOLL (346) treats the deeper tissues locally by injecting the remedy or by irrigation. In episcleritis irrigation with solutions of salicylate of soda are of benefit. In most cases of iritis and iridocyclitis and in diffuse keratitis, subconjunctival injections of sublimate ($\frac{3}{20}$ *mgr* with 5 *mgr* of cocaine) are useful. In scleritis and mild cases of diffuse keratitis injections of salicylate of soda (0.025 with 0.005 cocaine) are followed by good results.

III.—INSTRUMENTS AND REMEDIES.

347. CHIBRET. On antisepsis of the eye in general, and that by the cyanide of mercury in particular. *Arch. d'opht.*, xii., 7, p. 433.

348. MERGIER. A portable optometer for the rapid determination of ametropia and for measuring the visual acuity. *Ann. d'ocul.*, cviii., p. 351.

349. PRÉSAS. The application to physiological optical instruments of the decimal metric system in the divisions of the meridional quadrants. *Ann. d'ocul.*, cviii., p. 321.

350. DOR. On contact glasses. *Revue génér. d'opht.*, 1892, No. 11 ; and *Soc. des Sciences médicales de Lyon*, Séance du 2 Nov., 1892.

351. EATON. Practical application of the ophthalmometer of Javal-Schiötz. *Med. Record*, Nov., 1892.

352. GAVAZZANI. The action of cocaine on the retina and the optic nerve. *Boll. d'ocul.*, xiv., 23.

353. GEPPNER, JR. Knapp's roller forceps in the treatment of trachoma. *Centralbl. f. prakt. Augenheilk.*, 1892, p. 208.

354. HAAB. The use of very strong magnets for the removal of splinters of iron from the eye. *Report of the 22d Meeting of the German Ophth. Soc.*, p. 163.

355. HOFFMANN. An aluminium trial-frame. *Ibid.*, p. 200.

356. LEBER. Demonstration of apparatus. *Ibid.*, p. 187.

357. SCHWARTZ. A new lid-holder. *Ibid.*, p. 187.

358. WEISS, L. A simple exophthalmometer. *Ibid.*, p. 212.

After four years' experience CHIBRET (347) recommends the use of a 10 per cent. solution of cyanide of mercury for sterilizing instruments. The instruments are left ten minutes in this solution without injury, and are then put into a 1:1500 solution. With the same solution, to which is added 1:7000 of chloride of sodium, the conjunctival sac is washed out and cleaned, the conjunctiva being no more irritated than by a 1:4500 solution of sublimate, while in antiseptic strength this solution is equal to a 1:1500 solution of sublimate. The anterior chamber is washed out with cyanide of mercury, 0.05 ; chloride of sodium, 7.00 ; aqua, 1000.00 The two eyes are bandaged for one day only, after which the unoperated eye is left open, the other being covered with a little cotton which is held in place by a smoked glass. The author offers nothing new as to the treatment of purulent processes. He does not favor the galvano-cautery, in place of which he used tincture of iodine for touching ulcers, and also pyoctanin, and for gonorrhœal ulcer nitrate of silver 5 per cent.

V. MITTELSTÄDT.

MERGIER (348) speaks of the errors in Donders' method of estimating visual acuity and ametropia. Besides the fundamental errors—estimating the ametropia from the visual acuity, and measuring the visual acuity after correction of the ametropia—he criticises the use of letters in estimating the ametropia, and the varying size of the visual angle in index and curvature anomalies. (Nevertheless, Donders' method is on account of its simplicity much preferable to the use of Mergier's optometer, although theoretically the latter may be free from objection. An objection common to all optometers is that the eye retains during the examination the accommodative condition which it has when the instrument is first looked through.—*Reviewer.*) SULZER.

PRÉSAS (349) suggests that the perimeter arc be divided into 100° for each quadrant, and the horizontal projection of a hemisphere so divided to be used as a chart of the visual field. The circumference of the chart should also be divided into 400°. The 0°-point for each eye should lie on the nasal side as the intersection of the horizontal line with the circumference. For the right eye the numbers should run in the direction of the figures on the dial of a clock, for the left in the contrary direction, thus obtaining a symmetrical graduation of the chart for the two eyes.

DOR (350) has had good results with Sulzer's contact glass, particularly in cases of keratoconus. The glass is well borne by the patient. SULZER.

EATON (351) recommends the Javal-Schiötz ophthalmometer for the diagnosis of astigmatism, and reports several cases in which it was serviceable in solving difficult problems.

BURNETT.

GAVAZZANI (352) made retrobulbar and intraocular injections of cocaine in dogs, rabbits, and chickens, and found that, besides mydriasis and anæsthesia of the cornea and often of the conjunctiva, the retina showed a complete though transitory loss of function. All these symptoms disappeared within twelve to twenty-four hours. After intraocular injections symptoms of irritation came on which lasted longer. The quantity of cocaine used varied between $\frac{1}{10}$ and 1 *ccm* of 5 and 10 per cent. solutions. The author noticed also that in dogs besides the blindness a sort of intoxication came on, while the rabbits and chickens endeavored to hide themselves. DANTONE.

GEPPNER (353) treated more than sixty cases of trachoma with Knapp's roller forceps, and had only the best of results.

IV.—ANATOMY.

359. TERSON. A note on the acinous glands of the conjunctiva and on the orbito-palpebral lachrymal glands. *Arch. d'opht.*, xii., 12, p. 741.

360. GALLENGA. A contribution to the study of some congenital deformities of the lids: palpebral and superciliary coloboma and microblepharon. *Giorn. d. R. Accad. di Med. di Torino*, 1892, No. 7.

361. HESS. Contributions to the pathological anatomy of the congenital malformations of the eye. *Graefe's Archiv*, xxxviii., p. 92.

TERSON (359) described the acinous glands of the conjunctiva of the lid and of the retrotarsal fold as regards their structure, arrangement, and relation to the palpebral and orbital lachrymal glands. He considers the conjunctiva as a whole, the retrotarsal folds and the lachrymal glands included, and shows how the acinous glands and lachrymal glands form a connected whole. In their anatomical and physiological relations and in their secretion the different sections of this glandular system are to be considered identical. As to the operative removal of the lachrymal glands, the author believes this to be possible as regards the orbital gland, but not so as regards the palpebral.

V. MITTELSTÄDT.

GALLENGA (360) described some very interesting cases of congenital anomalies of the lid. The detailed anatomical description of the lid and the statements as to the part played by the neighboring tissues in the abnormal developmental processes cannot be given in a short abstract, and the reader is referred to the original. DANTONE.

HESS (361) described five cases of malformation of the eye in man, pig, and chick. Not one of the cases, according to the author's views, favored the inflammation theory, while some disproved it. In conclusion he described a pig-cyclops, the brain and eye of which were of particular interest.

V.—PHYSIOLOGY.

362. BITZOS. Scioscopy. Paris *Soc. scientifique*, 1891.

363. OSIO. The circulation of the intraocular fluids; the mode of nutrition of the vitreous; critical review of recent experimental studies on the subject. *Ann. di Ottalm.*, xxi., 4–5, p. 247.

364. FARAVELLI. On apparent movements. *Ibid.*, xxi., 4–5, p. 297.

365. FARAVELLI. Time as a co-efficient to be introduced in the determination of vision. *Riv. gener. ital. di. clin. med.*, iv., 12–13.

366. HEGG. On color perimetry. *v. Graefe's Arch.*, xxxviii., 3, p. 145.

367. LADD-FRANKLIN, CHRISTINE. A new theory of light perception. *Zeitschrift f. Psych. and Phys. d. Sinnesorgane*, iv., 3, p. 211.

368. v. KÖNIG and DIETERICI. The primary perceptions in normal and abnormal color systems and their intensities in the spectrum. *Ibid.*, 241.

369. DIMMER. Contributions to ophthalmoscopy. *Graefe's Archiv*, xxxviii., 4, p. 29.

370. ZUCKERMANN. On the processes in the resorption of granular pigment injected into the anterior chamber. *Graefe's Archiv*, xxxviii., 3, p. 60.

BITZOS (362) gives an accurate description of the different shadows seen in scioscopy. He distinguishes a lateral, a paracentral, and a central shadow, which move directly or indirectly. He speaks of the influence of refraction, oblique incidence, and spherical aberration on the phenomena. SULZER.

In a concluding paper on the course of the fluids in the interior of the eye, OSIO (363) describes his own experiments and those of others, and in a *résumé* of twenty paragraphs gives briefly the present status of our knowledge of the subject. DANTONE.

FARAVELLI (364) criticises the paper by Ferri on the apparent movement of objects with movements of the head while the eye fixes. Ferri substituted the arc for the chord in his geometrical demonstration. DANTONE.

The interesting investigations of KÖNIG and DIETERICI (368) cannot have justice done them in a brief review. Mono-, di-, and tri-chromatic color systems were tried on different persons with a color-mixing apparatus. The experimental and mathematical results support the Young-Helmholtz theory.

DIMMER (369) in the first part of his paper speaks of the location of opacities by comparison with the corneal reflex. An opacity lying in the centre of curvature of the cornea is always covered by the corneal reflex. An opacity lying in front of the centre of curvature moves with the observed eye and in a direction opposite to that of the observer's eye. The contrary is the case when the opacity lies behind the centre of curvature.

The margin of the lens appears dark in transmitted light, not on account of total reflection by the anterior surface of the lens of the light reflected from the fundus, but because this light is deflected by the portion of the lens near the equator, so that it does not enter the observer's eye. In incident light the margin of the lens appears as a bright gleaming line from the total reflection of the light at the posterior surface of the lens, when the

lens is dislocated into the anterior chamber. The light must pass through the equator of the lens and the neighboring parts in order to be totally reflected at the other side of the equator.

When the lens is so dislocated that a portion of the equator of the lens is turned toward the equator, the margin in incident light appears white or yellow from the light reflected from the interior of the lens, and totally reflected at its margin.

ZUCKERMANN (370) concludes that injections of cinnabar and india ink into the anterior chamber should not be employed to prove the existence of lymph spaces in the iris tissue which are in communication with the anterior chamber: first, for the reason that a fibrinous precipitate is formed, which holds the pigment granules; and second, for the reason that the granules are taken up by leucocytes and transported to other parts. The fact that the granules, before they are enclosed in the fibrinous masses, are able to pass into the protoplasm of the corneal and iridic endothelium without pushing farther into the tissues of the iris, make it improbable that there are lymph channels in the iris which communicate with the anterior chamber.

Sections VI.—XI. Reviewed by DR. HORSTMANN.

VI.—ERRORS OF REFRACTION AND ACCOMMODATION.

371. NORSA. School myopia. *Igiene dell' Infancia*, Sept., 1892.

372. BAAS. On the anatomy and pathogenesis of myopia. *Arch. f. Augenheilk.*, xxvi., p. 33.

373. HEGG. A case of partial contraction of the ciliary muscle. *Journ. d'ocul. du Nord de la France*, Aug., 1892.

374. BISSEL. Observations with Javal's ophthalmometer. *Journ. Oph., Otol., and Laryngol*, Oct., 1892.

375. ROOSA. The prevalence of corneal astigmatism in eyes with normal acuity of vision and without asthenopia. *N. Y. Med. Record.*, Nov. 26, 1892.

376. DE SCHWEINITZ. Some notes on corneal astigmatism in 200 eyes measured with the ophthalmometer of Javal in comparison with the total subjective astigmatism after complete mydriasis. *Therapeutic Gazette*, Nov. 15, 1892.

377. DEYNARD. The value of Javal's ophthalmometer for correcting astigmatism where marked amblyopia was present. *The Post-Graduate*, Dec., 1892.

378. KNAEPPLER. Considerations on the treatment and the correction of astigmatism. *Arch. d'opht.*, xi., ii., p. 679.

379. EATON. Some practical uses of the ophthalmometer of Javal-Schiötz. *Med. Record*, Nov. 12, 1892.

380. PERCIVAL. The relation of convergence to accommodation and its practical bearing. *Ophth. Rev.*, 1892, xi., p. 313.

NORSA (371) discusses in a popular way the school hygiene of the eyes and particularly with reference to the development of myopia. In the four classes of a school for teachers he found 69 per cent. of myopes, 65 per cent. in the first class and 71 per cent. in the fourth. DANTONE.

BISSEL (374) tabulates 500 eyes examined with the ophthalmometer, and whose refraction was otherwise tested. Of these 155 showed no astigmatism by the ophthalmometer or other test. In 110 all the tests showed the same astigmatism. In 192 the ophthalmometer showed more astigmatism (from 0.25 to 4 D) than the other tests, and in 43 it showed less; nearly all 0.25 D less, one 1, and one 1.25. BURNETT.

ROOSA (375) tabulates and analyzes 100 cases taken at random where there was no asthenopia, and visual acuteness was not less than $\frac{20}{20}$. Of these only 9 were found to be free from hypermetropia, as examined, generally, with the ophthalmoscope. There was no corneal astigmatism in 5 cases only. Corneal astigmatism in one eye only in 8 cases. The astigmatism was less than 0.5 D in 13 cases; it amounted to 0.5 D in twenty cases, and to 1 dioptry or more in 25, or one quarter of the whole. In all except the 9 cases there was hypermetropia of more than 1 D, sometimes as much as 3 D. In one case the corneal astigmatism amounted to 3 D. He infers from these examinations that the emmetropic eye is only an ideal and not a real condition. BURNETT.

In the analysis of DE SCHWIENITZ's (376) tables we find 150 eyes in which the corneal astigmatism was according to the rule. In 35 of these eyes the corneal and total astigmatism corresponded; in 6 the total was greater and in 109 it was less than the corneal, the average error being less than 0.5 D. In 21 eyes the corneal astigmatism was against the rule, and in 9 the corneal and total astigmatism were the same; in 12 it was different, the total being more in 8 and less in 4. Twenty-two eyes showed no astigmatism. In 12 of those a mydriatic showed total astigmatism 11 times against and once with the rule. The axis of

the corneal and the total astigmatism was found to be different (5° to 10°) in only 11.1 per cent. of the eyes. BURNETT.

DEYNARD (377) reports a number of cases of defective vision in which the ophthalmometer revealed a high degree of corneal astigmatism as a cause. Most of the cases were improved by strong cylinders. BURNETT.

EATON (379) adds his testimony to the value of the ophthalmometer in the diagnosis of astigmatism, and relates several cases where its employment was most useful in solving difficult cases. BURNETT.

PERCIVAL (380) calls attention to the fact that in most of the cases in which the relation between convergence and accommodation is disturbed, the correcting glasses cause discomfort until the patient has become accustomed to the new conditions. Neurasthenic patients accustom themselves to such glasses only with difficulty. WERNER.

VII.—LIDS.

381. DESPAGNET. Treatment of blepharitis with sublimate in large doses. *Rec. d'opht.*, 1892, ii., p. 641.

382. BLOCK. Ætiology of chalazion. *Med. Tydschrift voor Geneeskunde*, ii., p. 974, 1892.

383. TAY. A case of symmetrical whitening of eyelashes and eyebrows in connection with sympathetic ophthalmia. *Trans. Ophth. Soc.*, xii., p. 32.

384. LAGRANGE. Blepharospasm. *Journ. de méd de Bordeaux*, 1892, 43, p. 478.

385. PALERMO. Primary tuberculosis of the tarsus. *Ann. di Ottalm.*, xxi., 6, p. 538.

386. DODD, H. Morphœa of right lower lid and cheek. *Trans. Ophth. Soc.*, xii., p. 31.

387. LAGRANGE. Note on a case of cornu cutaneum palpebral. *Annal. d'ocul.*, cviii., p. 403.

388. FUKALA. Treatment of blepharitis, ectropium after blepharitis, and senile or sarcomatous blepharitis. *Zeitschr: d. böhm. Aerzte.*, 1892, 3.

389. JULES. Case of congenital cleft of the upper eyelid, associated with accessory auricles and a probable dermoid cyst beneath the conjunctiva at the left outer canthus. *Trans. Ophth. Soc.*, xii., p. 171.

390. KALT. The restoration of the lower lid destroyed in its entire thickness, at the expense of the upper lid. *Soc. d'opht. de Paris*, Nov. 8, 1892.

391. ROGMAN. Treatment of symblepharon; new operative procedure. *Arch. d'opht.*, xii., 10, p. 627.

DESPAGNET (381) has seen obstinate cases of ulcerative blepharitis which resisted the usual methods of treatment, cured by the successive use of solutions of bichloride of increasing strength, beginning with 0.5 per cent. and going up to 6 per cent. A fourth of its volume of glycerine is added to the solution. SULZER.

BLOCK (382) examined microscopically several chalazia that had been removed in their entirety. He found no tubercle bacilli. The formations resembling giant cells, which he found, must be considered as regressive products of glandular acini. Tangl may have examined a tubercular infiltration of the lid, mistaking it for chalazion. WESTHOFF.

TAY'S (383) patient, æt. twenty-eight, suffered from a sympathetic ophthalmia coming on thirty days after injury to the other eye. Three months later the eyelashes and eyebrows began to grow white. WERNER.

LAGRANGE (384) cured a blepharospasm that would not yield to any other method of treatment, by pulling out the external nasal nerves. SULZER.

PALERMO (385) described in detail a tuberculosis of the tarsus which he had produced in the upper lid of a rabbit and of a guinea-pig by transplanting a bit of tubercular iris from another rabbit. DANTONE.

In DODD'S (386) case there was no cause known to account for the patch of typical morphœa on the right lower lid and cheek. There was a scar from a wound at the external canthus. The disease began two years before, when the patient was aged fifteen. WERNER.

LAGRANGE (387) describes as follows the horn 22 *mm* long which he examined. At the base were the normal constituents of the skin, hypertrophic papillæ covered with proliferated epithelial cells. Within the horny substance were masses of epithelial cells proceeding from the papillæ. The yellow and fibrillar horny substance was given a characteristic appearance by the presence of numerous spherical masses of epithelial cells, the horny substance consisting of transformed cells.

FUKALA (388), in cases of senile or sarcomatous ectropium,

excises the affected portion of the conjunctiva and then sutures the cut edge to the margin of the lids, with satisfactory results.

HERRNHEISER.

VIII.—LACHRYMAL APPARATUS.

392. SNELL. A case of symmetrical dacryo-adenitis. *Trans. Ophth. Soc.*, xii., p. 51.

393. SIMI. Scraping the lachrymal sac and duct. *Boll. d'ocul.*, xiv., 20.

394. HARTRIDGE. Double lachrymal fistula (probably congenital). *Trans. Ophth. Soc.*, xii., p. 172.

In SNELL'S (392) case the glandular enlargement, for which there was no assignable cause, subsided under use of potass. iodid. During the attack the secretion of tears was arrested.

WERNER.

In obstinate cases of tear-trouble SIMI (393) advises scraping the walls. For this purpose he used two sounds—one with a flattened, sharp-cornered edge, the other with a blunt point but with two sharp edges running longitudinally.

IX.—MUSCLES AND NERVES.

395. ASTENGO. The relation of the angle α to strabismus. *Ann. di Ottalm.*, xxi., 4–5, p. 307.

396. LAGLEYZE. Treatment of strabismus by shortening the recti muscles. *Arch. d'opht.*, xii., 11, p. 668.

397. AYRES, S. C. Glasses on a child two years old for convergent strabismus. *Amer. Journ. of Ophth.*, 1892, No. 11, p. 339.

398. SEGUIN. Eye-strain and its relations to cerebral hyperæmia, etc. *N. Y. Med. Journ.*, Dec. 3, 1892.

399. STÖVER. A case of bilateral paralysis of the ocular muscles. *Münch. med. Wochenschr.*, 1892, 48, p. 863.

400. MERCANTI. Tonic reflex spasm of the intrinsic muscles of the eye. *Annal. di Ottal.*, xxi., 4–5, p. 380.

401. A discussion on miner's nystagmus. *Brit. Med. Journ.*, 1892, p. 834.

402. DELEPINE. A case of aphasia and right hemiplegia with temporary spasmodic conjugate deviation of the eyes, excited by attempts to converge the eye strongly toward the middle line. *Brit. Med. Journ.*, Sept., 1892, p. 571.

ASTENGO (395) publishes several tables of Landolt, which give the relation of angle α in strabismus. From his measurements it is evident that there is no relation between the angle α and the angle of strabismus even in marked cases of squint. Angle α is more frequently positive than negative, and both conditions are more frequent in convergent than in divergent squint.

DANTONE.

LAGLEYZE'S (396) operation advances the tendon of the antagonistic muscle by folding it with a suture, which is drawn until the eyes stand straight and then knotted. The author believes that in this way the effect may be accurately guaged.

V. MITTELSTÄDT.

AYRES (397) reports a case of convergent squint in a child of two years, for which he advised glasses (strength not stated), with the result of a complete cure of the strabismus. There was no difficulty in getting the child to wear them. BURNETT.

SEGUIN (398) considers insufficiencies of the ocular muscles (supplied by the third and sixth pairs of nerves) from the standpoint of the neurologist. Symptomatically the differential diagnosis between a weakness of the third and sixth nerve is that in the former the pain or discomfort is referred most generally to the occiput or cervical region ; in the latter it is mostly confined to the head in the shape of a constriction-feeling, and there is a tendency to vertigo. In treatment directed to the eyes he recommends prisms and tenotomies. BURNETT.

MERCANTI (400), in a girl æt. twelve, who had suffered from a corneal inflammation, observed a severe blepharospasm and a contraction of the facial muscles of the same side. When the lids were forcibly opened the eyeball was seen to be abducted as in oculomotor paralysis. The blepharospasm was cured by suggestion, after which for some days the position of the eye alternated between abduction and adduction. The author considers these disturbances of the ocular movements as contractures of the muscles, which were brought about reflexly by the spasm of the orbicularis and facial muscles during the corneal inflammation and outlasted the primary affection. DANTONE.

A Discussion on Miner's Nystagmus (401). Including :

A chapter in the early history of miner's nystagmus. By J. H. Bell.

A case of miner's nystagmus associated with double spasmodic torticollis. By W. T. Cocking.

Defective illumination as the cause of the nystagmus and other ocular disorders observed in miners. By J. Court.

The combined influence of attitude and deficient illumination. By H. B. Hewetson.

Fatigue of ocular muscles owing to the constrained attitude at work as the main cause of nystagmus. By Simeon Snell.

The importance of imperfect illumination as a factor in the production of nystagmus. By G. T. Thompson.

Attitude and deficient illumination both important factors in the production of miner's nystagmus. By Priestley Smith.

Considerable diversity of opinion existed as to the influences causing nystagmus, as is evident from the titles of the papers. It was proposed to appoint a committee to collect evidence.

WERNER.

DELEPINE's (402) patient, a woman, æt. twenty-three, got an attack of complete right hemiplegia after rheumatic fever. On close convergence and during some fits conjugate deviation of the eyes, to the paralyzed side, took place. The visual acuteness and ophthalmoscopic conditions are not noted. There was extensive softening of the left motor area and typical descending degeneration. The deviation of the eyes is attributed by the author to inflammatory irritation of a centre implicated, but not destroyed, by disease, added to the stimulus caused by a volitional effort of convergence. WERNER.

X.—ORBIT AND NEIGHBORING CAVITIES.

403. BADUEL. On a case of orbital abscess from a lesion of the bone with secondary communication with the nasal cavity, and hydrops of the frontal sinus. *Ann. di Ottal.*, xxi., 4 and 5, p. 377.

404. BECCARIA. Two cases of abscess of the frontal sinus. *Ibid.*, p. 359.

405. DUJARDIN. A pipe-stem retained in the orbit and superior maxilla for four weeks without grave results. *Journ. des sciences méd. de Lille*, April 15, 1892.

406. JACCOUD. Treatment of exophthalmic goitre. *Gaz. des hôpitaux*, Nov., 1892.

407. SPICER. Orbital hemorrhages occurring in young children. *Trans. Ophth. Soc. Unit. Kingd.*, xii., p. 33.

408. JULER. Symmetrical tumors of both orbits—probably sarcomatous. *Ibid.*, p. 44.

409. BEAUMONT. Note of a case of exostosis of the orbit. *Ibid.*, p. 41.

410. WHERRY. Specimen of orbital neuroma, about the size of a large walnut, which caused proptosis, and led to removal of the eye. *Ibid.*, p. 40.

411. ROCKLIFFE. Monophthalmic proptosis. *Ibid.*, p. 38.

In probing an incised orbital abscess, BADUEL (403) discovered an opening in the orbital wall, which led into the nose. When the cavity was syringed, not only pus came from the nose, but a gelatinous mass, which must have come from the frontal sinus. The disease was cured without injury to the eye or its functions. DANTONE.

BECCARIA (404) described two cases of abscess of the frontal sinus. In both the diagnosis was easy, a fluctuating tumor being found above the inner commissure. Incision, drainage, and antiseptic washes led to a speedy recovery. DANTONE.

JACCOUD (406) for the treatment of Basedow's disease recommends hydro- or electro-therapy, together with the administration of arsenic (0.004–0.008 daily), or potas. brom. (2.00–4.00). Milk diet is of value in mild cases. SULZER.

SPICER'S (407) three cases present the following features in common, viz.: they were under one year of age, were hand-fed, and were subject to sudden hemorrhages in the orbits; in two cases this followed a fit of crying, and in one there was catarrhal ophthalmia. The author regards the condition as infantile scurvy, and of the same nature as the cases described by Barlow as scurvy-rickets in the *Medico-Chirurg. Trans.*, vol. lxvi. Two of Spicer's cases had symptoms of rickets. WERNER.

JULER (408) records the case of a lady, æt. forty-five, in whom symmetrical tumors formed in each orbit, in the position of the lachrymal glands, leading to ptosis on both sides, and anæsthesia of left side of forehead. Examination of portion of the tumor indicated round and spindle-celled sarcoma. Several cases of bilateral lympho-sarcomata of the orbits were referred to in the discussion on this paper. WERNER.

BEAUMONT (409) removed an ivory exostosis of the orbital roof in a girl, æt. fourteen. The base was somewhat pedunculated. Drills and chisels were employed. The recovery was complete. WERNER.

WHERRY'S (410) patient, a man, æt. thirty-five, suffered from "neuralgic pains all over" and sleeplessness; the right eye be-

gan to protrude eight years before operation. The tumor, which was made up of fibrous tissue, had a nerve attached to it, presumably the third, from its size and resulting ptosis.

WERNER.

In ROCKLIFFE'S (411) case there were absolutely no symptoms to enable a diagnosis of the cause of proptosis to be made. Sixteen months later the protrusion was increased. WERNER.

XI.—CONJUNCTIVA, CORNEA, SCLERA, ANTERIOR CHAMBER.

412. MORAX. Bacteriological and clinical researches on catarrhal conjunctivitis. *Ann. d'ocul.*, cviii., p. 395.

413. PARYSCHEW. Intra-uterine infection with blennorrhœa. *Wratsch*, 1892, No. 47.

414. SCHNELLER. On the treatment of follicular conjunctivitis. *Graefe's Archiv*, xxxviii., 4, p. 52.

415. ADAMÜCK. The trachoma question again. *Wjestnik Ophth.*, 1892, No. 6, p. 514.

416. ABADIE. Surgical treatment of granular conjunctivitis. *Arch. d'opht.*, xii., 10, p. 626.

417. JITTA. Excision of the retrotarsal fold in trachoma. *Med. Tydschrift voor Geneeskunde*, part ii., p. 1092.

418. VAN MOLL. Metastatic conjunctivitis. *Ibid.*

419. HODGES, R. C. Unusual effect of jequirity in chronic trachoma. *Ophth. Record*, Dec., 1892.

420. MINOR, JAMES L. Unusual form of polypoid tumor of the conjunctiva. *Annals of Ophth. and Otol.*, Oct., 1892.

421. MICHEL, MIDDLETON. Plica circularis conjunctivæ in the negro. *Med. News*, Oct. 22, 1892.

422. TWEEDY. The physical factor in conical cornea. *Trans. Ophth. Soc. Unit. Kingd.*, xii., p. 67.

423. BRONNER. Case of recurrent keratitis superficialis punctata in which cocaine aggravated the symptoms. *Ibid.*, xii., p. 74.

424. COLLINS, E. T. Epithelial implantation cyst of cornea. *Ibid.*, xii., p. 64.

425. CROSS. Pemphigus of the conjunctiva. *Ibid.*, xii., p. 58.

426. DODD, H. W. Tubercular disease of the conjunctiva with infiltration of the cornea affecting the left eye. *Ibid.*, xii., p. 61.

427. COLLINS, E. T., and CROSS. Two cases of epithelial implantation cyst in the anterior chamber after extraction of cataract. *Ibid.*, xii., p. 175.

428. STEPHENSON, S. Scarring of the conjunctiva from ophthalmia neonatorum ; its characters, frequency, and associations. *Ibid.*, xii., p. 54.

429. MEYER, E. Note on a particular form of infectious keratitis. *Soc. d'opht. de Paris*, Nov. 8, 1892.

430. FUKALA. A new method of treating corneal abscess. *Berliner klin. Wochenschr.*, 1892, No. 49.

431. NUEL. Filamentous keratitis. *Arch. d'opht.*, xii., 10, p. 593.

432. HESS. Clinical and experimental studies on the development of striped corneal opacity after cataract extraction. *Graefe's Archiv*, xxxviii., 4, p. 1.

433. OLIVER. Symmetrically placed opacities of the cornea occurring in mother and son. *Ophth. Rev.*, xi., p. 349.

MORAX (412) has found that the secretion of catarrhal conjunctivitis usually contains in pure culture the small bacillus described by Koch and Kartulis in Egypt and Weeks in New York. The clinical picture may vary with the virulence of the micro-organisms and may even simulate purulent conjunctivitis, in which case the bacteriological examination is of great importance. In the new-born the bacillus of conjunctival catarrh produces the clinical picture of ophthalmia neonatorum. It was found constantly in conjunctivitis catarrhalis, while it was not found once in seventy cases of conjunctivitis lachrymalis, phlyctenularis, or blepharo-conjunctivitis. In some cases it produces localized yellow swellings on the intensely injected conjunctiva bulbi, which are distinguished from the ordinary phlyctenulæ by the absence of a surrounding injection and by their localization.

Morax is the first that has been able to obtain a pure culture of the bacillus. The secretion used was obtained from a very severe case complicated with a corneal lesion. Agar and bouillon were used as culture media. The vitality of the cultures is slight. Inoculations of the pure cultures remain sterile, and even in the first culture the bacillus soon loses the ability to take the stain.

SULZER.

PARYSCHEW (413) reports the case of an eight months' fœtus born with a well-developed blennorrhœa and affected corneæ,

the secretion containing gonococci. The amniotic fluid had escaped three days before birth. In Prof. Lebedew's clinic, where the case was observed, no prophylactic measures are taken except the repeated syringing of the genital passages with sublimate, $\frac{1}{2000}$ to $\frac{1}{3000}$. In 1,048 cases of labor only two cases of blennorrhœa occurred, of which the case reported was one.

HIRSCHMANN.

SCHNELLER (414) recommends, according to the severity of the case, sublimate, $\frac{1}{10.000}$; trichloride of iodine, $\frac{1}{5000}$; acetate of lead, excision of the retrotarsal folds with or without the adjacent conjunctiva, and portions of the tarsus. In pannus crassus he does peritomy.

ADAMÜCK (415) believes that follicular conjunctivitis and trachoma should be differentiated, and patients with the former disease isolated from trachoma patients, since they are predisposed to trachoma, but only acquire it by infection. In treatment the author prefers the copper stick. When the retrobulbar folds are severely affected he advises cutting them out with scissors. Trachoma may be due to different microbes, and this may account for its varying course. In some severe cases the excised retrotarsal folds show characteristic tubercle bacilli.

HIRSCHMANN.

ABADIE (416) finds that his surgical treatment of trachoma (deep scarifications and brushing with bichloride) is used with success by others, particularly in one district in Algiers, where ten per cent. of the population are blind from trachoma, and twenty-five to thirty per cent. of the military forces are incapacitated from this cause. He says that no complication is to be feared, and that the cure is rapid. New brushes should be thoroughly cleaned and sterilized in order to prevent animal infection.

v. MITTELSTÄDT.

JITTA (417) does not use sutures after excision of the retrotarsal folds, and he leaves the eyes open after the second day. In but two cases was the tarsus removed, and the result was bad. In 1,000 trachoma patients 75 cases were operated 114 times. The result was in 68 cases very favorable, 27 improved, 13 no improvement, 6 unknown. Too much of the conjunctiva should not be removed. In the following discussion it was said that very good results were obtained from the use of Knapp's roller forceps.

WESTHOFF.

VAN MOLL (418) believes that the conjunctiva may become inflamed secondarily from infection from within, and that a con-

junctivitis may develop in gonorrhœa just as an arthritis does. He made culture in such a case and found the staphylococcus. A suspension of the culture was injected into the blood of a dog, and some days later a conjunctivitis developed, which showed in its secretion the microbes injected into the blood.

WESTHOFF.

The unusual features about HODGES' (419) employment of jequirity are that he employed it as an infusion dripped into the eye every day for several weeks with only a slight reaction, but with very beneficial results as regards the conjunctiva and cornea. BURNETT.

MINER (420) reports a case of long pedunculated polypus springing from the caruncle, which was found to have a cavity filled with pus and which communicated with the lachrymal sac.

BURNETT.

MICHEL (421) describes an elevation around the corneal base, yellowish-gray and pigmented and which seems to correspond perfectly with cases of circumcorneal hypertrophy of the conjunctiva, which the reviewer has seen in the negro, in whom this disease, in its bulbar aspect, is much more pronounced than in the white race. Michel regards such cases as congenital and not pathological, an opinion with which the reviewer is not inclined to agree, unless its congenital character could be made clear by an accurate history. Some cases of circumcorneal hypertrophy are very persistent and chronic and change little from year to year. BURNETT.

TWEEDY (422) attributes the occurrence of conical cornea to inherent weakness of its central portion owing to three factors in its development—viz.: 1. The separation of the epiblastic involution which forms the lens. 2. The intrusion of mesoblastic tissue in the homogeneous corneal tissue, which intrusion may not be complete in the centre. 3. The peripheral vascular distribution. WERNER.

In BRONNER'S (423) case the superficial punctate keratitis recurred for twenty-five years mostly in March and April. Patient was a man aged forty-eight. The attacks lasted from three to ten days. WERNER.

In COLLINS' (424) case, after an injury, anterior synechia followed, with tendency to bulging, which was not relieved by iridectomies. After excision it was discovered that there was a cyst, 9 *mm* by 5 *mm*, partly in the cornea and partly in the sclerotic;

its inner surface was lined by laminated epithelium, and there was a smaller similar cyst in the adherent iris.

WERNER.

CROSS (425) records the case of a woman æt. forty-seven who suffered from frequent attacks of pemphigus, chiefly affecting the throat and mouth. The conjunctiva in both eyes was shrunken; a whitish membrane covered the inside of the lids and passed across the caruncles. The ocular conjunctiva was red and velvety, overlapping the cornea, whose margins were vascular.

WERNER.

DODD'S (426) patient, æt. fifteen, with evidence of general tubercular diathesis, exhibited on both lids of left eye granular atches of the shape of a cock's-comb as described by Arlt.

WERNER.

CROSS' (427) first patient had the eye enucleated, about a year and a half after a cataract extraction, for glaucoma, which began six months after removal of the cataract. A large cyst filled the anterior chamber and coloboma, its inner surface being lined by laminated epithelium. In the second case a similar cyst existed. Extraction had been performed; the cornea became hazy, due probably to use of biniodide of mercury, and a thick opaque membrane filled the pupil. Glaucoma supervened.

WERNER.

STEPHENSON (428) divides the cicatricial changes into typical and atypical; in the former a thin bluish scar covers the lower palpebral conjunctiva and upper fornix, the upper lid being free. As to frequency rural schools had 0.15 per cent. of scarred lids, urban schools 0.59 per cent., and pauper schools 1.88 per cent. The author did not see a single case of pyramidal cataract without scarring of the lids. WERNER.

MEYER (429) calls attention to the rare but characteristic cases of corneal affection in which a gray concentric opacity forms about a small, white, round, central subepithelial focus. The affection is extremely chronic and runs its course with irritation of the conjunctiva or vascularization of the cornea.

SULZER.

FUKALA (430) carefully cut off with iris scissors all the necrotic portion of the cornea in the neighborhood of the ulcer.

According to NUEL'S (431) investigations, the so-called filamentous keratitis is a disease of the corneal epithelium of hypertrophic nature. The filaments consist of an axial spirally twisted thread and a striped sheath. The corneal epithelium lengthens

in a spindle form in rows, and at the intersection of two or more of these rows an elevation appears above the surface, first in the form of a cone and then as a long filament whose fibres still show epithelial nuclei. About this filament, which gives a keratin reaction, and, as Nuel believes, is an analogue of the corneal horn, are then deposited epithelial scales that have undergone a mucoid degeneration, wandering cells, and detritus from the cornea and the conjunctival sac. To demonstrate the origin of these filaments the superficial corneal lamellæ must be removed with them. By the movement of the lids the primarily vesicular elevations may become lengthened and form filaments. The author leaves it undecided as to whether such filaments arise from corneal ulcers; they apparently do from injuries. Therapeutically good results were obtained by dropping a two-per-cent. solution of ammon. chloride into the eye six to ten times daily.

v. Mittelstädt.

According to Hess (432) the common opinion that the so-called striped corneal opacity after cataract extraction is due to á swelling or loosening of the corneal substance is incorrect. The main anatomical change is a folding of the deeper portions of the cornea causing the layers to assume a wavy form. The cause of this folding is the difference in the tension in the vertical and the horizontal meridian of the cornea after the section.

Sections XII.—XXI. Reviewed by Dr. P. SILEX, comprising Third and Fourth Quarters of 1892.

XII.—IRIS.

434. Oemisch. On sarcoma of the iris. Inaug. Dissert., Halle 1892.

435. Van Duyse. Spontaneous recovery of iris tuberculosis; attenuated tuberculosis of the iris. *Arch. d'opht.*, xii., 8, p. 478.

436. Snellen. Tuberculosis of the eye. *Med. Tydschrift voor Geneeskunde*, ii., 1892.

437. Cant. On the management of prolapse of the iris after simple cataract extraction. *Brit. Med. Journ.*, 1892, p. 834.

438. Redmond. Tubercle of iris. *Trans. Ophth. Soc. Unit. King.*, xii., p. 85.

439. Knaggs. Case of tuberculosis of the iris, the suspensory ligament, and the retina. *Ibid.*, p. 79.

OEMISCH (434) reported a case of leucosarcoma in a woman aged forty-two, and reviewed the eighteen cases reported since Fuchs' publication in 1882. The literature now contains reports of thirty-five carefully studied cases. It occurs mostly in women, and usually after the fortieth year. The point of origin is commonly the iris stroma. The prognosis is good. The treatment consists in the removal of the affected portion of the iris.

VAN DUYSE (435) after reporting a case of spontaneous cure of iris tuberculosis in a child aged twelve, discusses the different views as to the cause and prognosis of the disease, and accepts the opinion of Liebrecht and Leber that there is a benign form of iris tuberculosis. He rejects the view of Vossius, and comes to the conclusion that in an iris tuberculosis running a chronic course, which is not primary, no operative measures should be undertaken, and enucleation should be done only in the cases running a rapid course and when the eyeball is perforated.

v. MITTELSTÄDT.

SNELLEN (436) reports two cases of tuberculosis of the eye. One was a case of tuberculosis of the iris in a boy aged nine, affected also with white swellings, and the other a case of tuberculosis of the choroid. In the latter the appearance resembled that of glioma. The growth involved the sclera and the conjunctiva, and there was a tubercular ulcer of the conjunctiva. Tubercle bacilli were discovered.

CANT (437) operates in patient's own bed, without speculum. If prolapse occur he excises it under chloroform within twenty-four hours after extraction. WERNER.

REDMOND (438) succeeded in discovering a few bacilli in the diseased iris. The patient, aged ten, was in good health one and a half years after enucleation. WERNER.

In KNAGGS' (439) case the cells made their way through the suspensory ligament into the canal of Petit, but stopped abruptly at the hyaloid membrane. WERNER.

XIII.—CHOROID.

440. LAWFORD. Remarks on the pathology of some intra-ocular tumors. *Brit. Med. Journ*, 1892, p. 840.

441. MORTON, A. A group of cases of tubercles in the choroid, presenting some unusual features. *Ibid.*, 1892, p. 1190.

442. STORY. Detachment of choroidea. *Trans. Ophthal. Soc. Unit. King.*, xii., p. 157.

443. V. SCHRÖDER. A case of cure of a sarcoma in the orbit extending from the choroid. *Petersburg. med. Wochenschr.*, 1892.

444. LAGRANGE. On leucosarcoma of the choroid. *Arch. d'opht.*, xii., p. 1.

445. DARIER. Subconjunctival injections of bichloride in diseases of the choroid and retina. *Soc. franc. d'opht.*, May 5, 1892.

LAWFORD (440) is inclined to believe that many so-called sarcomata are in reality carcinomata arising in the glandular epithelium of the ciliary body. WERNER.

MORTON (441) records five cases of tubercle of choroid, all occurring in children suffering from general tuberculosis.

In Case I. there was a peripheral white patch slightly larger than the disc with a ring of dark pigment. The retina was adherent to the choroid and infiltrated by the tuberculous mass. In Case II. there were two pigmented patches almost equal in size to the disc and to its inner side. The tubercles were also pigmented in Case III. Case IV. exhibited patches of atrophied choroid along with a tubercular mass. In Case V. there were twenty-one tubercles in one eye, and seventeen in the other. WERNER.

In STORY'S (442) case the stroma and vessels of the choroid were distinctly visible under a detachment of the retina, both being visible in some places with +8 D lens. WERNER.

SCHRÖDER (443) in March, 1891, diagnosed sarcoma of the choroid in a woman aged twenty-eight, and, as appeared after the enucleation, the growth had extended back in the optic nerve and had formed numerous metastases in the orbit that could not be removed. A quantity of pure blue pyoktanin was strewed in the wound. No recurrence had taken place in 1892, and this was ascribed to the caustic effect of the pyoktanin.

LAGRANGE (444) reports two cases of leucosarcoma and comes to the following conclusions: Leucosarcoma stands, in relation to melanosarcoma as regards frequency, as 1: 10, and is found more frequently in adults than in children. Half the cases are round-celled and half spindle-celled; and it is relatively less malignant than melanosarcoma. The unfavorable cases are almost all round-celled sarcomas. They quickly extend through the optic nerve into the orbit, and require exenteration of the orbit, while the spindle-celled sarcomas are cured by enucleating the eye. V. MITTELSTÄDT.

DARIER (445) has had good results with subconjunctival injections of bichloride in various macular affections, and in disseminate choroiditis. These injections are of service even in the cases where internal mercurial medication has been fruitless. Dufour, Abadie, Coppez, and Chibret have confirmed Darier's results, Despagnet and Vignes doubt them. SULZER.

XIV.—GLAUCOMA.

446. CRITCHETT. A case of double subacute glaucoma in a patient aged twenty-nine. *Trans. Ophth. Soc. Unit. King.*, xii., p. 86.

447. WEINBAUM. A case of hemorrhagic glaucoma with thrombosis of the central vein of the retina and ectropium uveale. *Graefe's Archiv*, xxxviii., 3, p. 191.

448. BOURGAN. On hemorrhagic glaucoma. *Thèse de Paris*, 1892.

449. FUKALA. Therapeutic notes. *Berliner klin. Wochenschr.*, 1892, p. 1248.

450. HOTZ. A case of so called hemorrhagic glaucoma. *The Ophth. Record*, Dec., 1892.

CRITCHETT'S (446) patient, a lady, received a severe shock from the death of a sister fifteen days before the onset of glaucoma. P. l. was doubtful; iridectomy was performed a fortnight later; ultimately V recovered to $\frac{10}{100}$, and remained so when last seen, *i. e.* seventeen years after operation.

WERNER.

In WEINBAUM'S (447) patient, æt. twenty-six, the vein was filled with an indifferent young granulation tissue. The retinal hemorrhages and the glaucoma probably resulted from this thrombus, of which the cause was unknown.

FUKALA (449) believes that when one eye is blind from glaucoma, the second should be operated before the outbreak of glaucoma.

HOTZ (450) substantiates the opinion that there is no real connection between the hemorrhages and the increase of tension in the so-called hemorrhagic glaucoma by a case in which one eye had been lost by glaucoma after two iridectomies, and there were subsequently hemorrhages in the other eye followed at an interval of six weeks by an outburst of glaucoma, which, however, was cured by an iridectomy. BURNETT.

XV.—SYMPATHETIC OPHTHALMIA.

451. SCHIRMER. On sympathetic inflammation without perforation of the eye primarily affected. *Report of Heidelberg Ophth. Soc.*, 1892, p. 449.

452. SCHIRMER. Clinical and pathological studies on the pathogenesis of sympathetic ophthalmia. *Graefe's Archiv*, xxxviii., 4, p. 95.

453. DE WECKER. The prophylaxis of sympathetic ophthalmia. *Ann. d'ocul.*, cvii., p. 412.

454. DE WECKER. Post-operative sympathetic ophthalmia. *Ibid.*, p. 81.

455. VALUDE. New methods of treating sympathetic ophthalmia. *France méd.*, 1892, 24, p. 378.

456. BAQUIS. Abadie's method of treating ophthalmia migratoria. *Ann. di Ottalm.*, xxi., 4–5, p. 300.

457. DRACOULIDIS. A late form of sympathetic ophthalmia. *Soc. d'opht. de Paris*, April 5, 1892.

SCHIRMER (451) distinguishes sharply between sympathetic irritation and inflammation. He endeavors to fix the pathogenesis of the latter by a critical study of clinical histories and by pathological investigations. He confirms the dictum of Schweigger that we have no sure criterion of the sympathetic nature of a given case. We must take into account the nature of the affection in the eye primarily affected, the nature of the affection in the second eye, and the interval between the two outbreaks. Of the diseases described as affecting the primary eye, he finds herpes zoster ophthalmicus and symblepharon not proven, sarcoma of the choroid and glioma of the retina not capable *per se* of causing sympathetic trouble, but only when complicated with irido-cyclitis, and cysticercus like herpes. Subconjunctival ruptures of the ball only cause sympathetic inflammation when an irido-cyclitis from ecto- or endo-genous infection has developed in the injured eye. Clean incarcerations and ruptures of iris tissue may at the most cause sympathetic irritation. Eyeballs containing bone are only dangerous when they show signs of internal inflammation. Spontaneous inflammations as the cause of sympathetic inflammation do not stand criticism. Sympathetic inflammation after operation is due to a uveal inflammation of microbic origin (traumatic uveitis plastica). Panophthalmitis does

not dispose to sympathy ; if, however, an inflammation arises, the staphylococcus may not have been able to destroy Sattler's hypothetical organism of sympathetic ophthalmia. The gonococcus, the bacilli of tuberculosis and of lepra, and conjunctival irritation by an artificial eye do not cause sympathetic inflammation. The interval between the affection of the two eyes varies between three weeks and an unlimited period, but in the latter case the proof of an inflammation in the first eye is necessary. Even after enucleation, exenteration, neurotomy and optico-ciliary neurectomy, sympathetic inflammation may develop without a preceding irritation. The inflammation in the second eye is generally a uveitis or a papillo-retinitis, separate or combined. There is no sympathetic conjunctivitis, keratitis, cataract, detachment of retina, glaucoma, or optic-nerve atrophy. The isolated papillo-retinitis, caused probably by the action of the bacterial products from the primary eye, disappears immediately after enucleation and has a good prognosis. Sympathetic uveitis may be divided into iritis serosa plastica and irido-cyclitis plastica, with their transition forms. The prognosis is generally bad. The negative results of bacteriological examination of the first eye may possibly be due to the lack of suitable culture media and of stains for detecting the producer of the disease. Against the ciliary-nerve theory and for the bacterial, speak the possibility of propagation, the obstinate course with relapses, the absence of prodromal symptoms, the minimum interval of three weeks, the sympathetic inflammation after enucleation, and the fact that there must be always an infectious uveal disease. The specific micro-organism and the channels through which it passes are not yet known.

Pathological examinations of the first eye showed plastic iritis and cyclitis, and a nodular or more diffuse round-celled infiltration of the choroid.

DE WECKER'S (453) statistics show that during the period of linear extraction the cases of operative sympathetic inflammation were more frequent than during the period of flap extraction, which he has practised since 1875. He proposes the question of the relation of simple extraction to that with iridectomy in this respect, and requests his colleagues to assist in the solution by reporting their own observations. SULZER.

VALUDE (455) reports the clinical history of a patient in whom subconjunctival injections of bichloride and resection of the optic nerve were followed by but transient results, while enuclea-

tion succeeded in checking permanently the periodic attacks of sympathetic inflammation. SULZER.

BAQUIS (456) in a case of sympathetic ophthalmia made injections of sublimate (2 drops of a 1:500 solution) into the vitreous of the injured eye as proposed by Abadie, and was well satisfied with the results. An improvement in the second eye was noticed the following day. A week later the injection was repeated and all signs of irritation disappeared from both eyes, and the injured eye began to atrophy, but remained free from irritation and pain. DANTONE.

DRACOULIDIS (457) saw sympathetic ophthalmia break out twenty years after the original injury. The patient was a smith in whose eye a chip of iron had flown when he was twenty-three years old. After remaining free from irritation for twenty years the injured eye suddenly developed a severe irido-cyclitis which soon led to sympathetic ophthalmia. Examination of the injured eye showed that the foreign body was imbedded in a chalky capsule. SULZER.

XVI.—VITREOUS.

458. SGROSSO. Synchisis scintillans and spintheropia. *Rev. gén. d'ophth.*, 1892, No. 11.

459. BEAUMONT. Hemorrhage into the vitreous associated with epistaxis. *Ophth. Review*, ix., p. 352.

SGROSSO (458) saw synchisis scintillans in a man æt. thirty-two, an inhabitant of the Roman Campagna, after severe malarial attacks. Puncture of the anterior chamber relieved the entopic symptoms for a time. The aqueous which escaped contained crystals of cholesterin, tyrosin, margarin, phosphates and fatty detritus. An irido-cyclitis which developed later made enucleation necessary. Microscopic examination showed old inflammatory processes in the uveal tract, retina, optic nerve, and vitreous. SULZER.

BEAUMONT'S (459) patient was a young man æt. twenty-three, who was suffering from epistaxis every spring and summer, with headache. No constipation. WERNER.

XVII.—LENS.

460. COLLINS, E. T. On the minute anatomy of pyramidal cataract. *Trans. Ophth. Soc. Unit. King.*, xii., p. 89.

461. WRAY. Ætiology, prognosis, and treatment of disseminated dot cataract. *Ibid.*, xii., p. 109.

462. ROBINSON. Spontaneous cure of cataract: second sight. *Brit. Med. Journal*, May, 1892, p. 1075.

463. HIGGENS, C. Case of spontaneous disappearance of cataract. *Trans. Ophth. Soc. Unit. King.*, xii., p. 107.

464. MCCOY, THOS. F. A new shield for the protection of the eyes after cataract extraction. *Med. Record*, Dec. 3, 1892.

465. MITVALSKI. On the spontaneous cure of senile cataract by means of intracapsular absorption, with remarks on Morgagnian cataract. *Centralbl. f. prakt. Augenheilk.*, xvi., p. 289.

466. NICATI. On the discovery of a method of extracting cataract capable of preventing incarceration and hernia of the iris or of diminishing their effects. *Arch. d'opht.*, xii., No. 12, p. 731.

467. SANTOS FERNANDEZ. On the treatment of cataract in glaucomatous eyes. *Ann. d'ocul.*, cviii., p. 343.

468. RANDOLPH. A series of fifty consecutive cataract operations. *Johns Hopkins Hospital Bulletin*, No. 20, March, 1892.

469. KORSCHENEWSKI. Report on 1,500 cases of cataract extraction. *Medicinskoje Obosrenie*, 1892, No. 11.

470. DE WECKER. What advancement remains to be realized in the extraction of cataract. *Arch. d'opht.*, xii., 6, p. 350.

471. KNAPP. The methods and results of the simple extraction of cataract. *Journ. Amer. Med. Assoc.*, Sept. 3, 1892.

472. LANDOLT. The operation for cataract in our day. *Arch. d'opht.*, xii., pp. 402, 465, 529.

473. DE WECKER. Simple extraction and combined extraction. *Ibid.*, xii., p. 657.

474. NUËL. On some corneal troubles following the extraction of cataract. *Soc. franç. d'opht.*, May 2, 1892.

475. SUAREZ DE MENDOZA. New points on suturing the cornea in the extraction of cataract. *Ibid.*, May 2, 1892.

476. GÜLLSTRAND. A case of lenticonus posterior. *Nord. Ophth. Tids.*, v., 1, Copenhagen.

477. GALEZOWSKI. On a new operative procedure for the extraction of secondary cataract. *Soc. franç. d'opht.*, May, 1892.

478. CHIBRET. On ouledialysis. *Soc. d'opht. de Paris*, Feb. 2, 1892.

From the examination of six cases of pyramidal cataract in different stages, COLLINS (460) finds that at first a mass of proliferated epithelial cells forms underneath the anterior capsule, which disturbs and breaks up some of the lens fibres in contact; later on the mass becomes condensed, homogeneous, and laminated, and contains a few cells; the hyaline capsule splits into two layers, enclosing this mass between them, the posterior layer being, according to the author, secreted by the cells lining it. He also supposes that the normal lens capsule is a product of cellular secretion. In all six cases there was corneal ulceration.

WERNER.

WRAY (461) noted four varieties of this form of congenital cataract, viz.: 1st, the simple form, small whitish or bluish dots, mostly peripheral; 2d, the above with opaque streaks; 3d, vacuoles, plus dots and streaks; 4th, degenerative changes in addition. In no case was the cataract absent in the patient's mother. WERNER.

ROBINSON (462) states that he has seen three cases of spontaneous improvement in sight, due to softening and partial absorption of Morgagnian cataracts. WERNER.

HIGGENS' (463) patient, æt. fifty-seven, had mature cataract for eighteen years, he then began to notice an improvement in the sight, and V became $= \frac{6}{36}$ with $+ 3\frac{1}{2}$-inch lens. There was some opaque membrane in the pupil. WERNER.

MCCOY'S (464) shield consists of two cups made of light wire (not gauze), which are held over the eyes by means of tapes.

BURNETT.

MITVALSKI (465) adds two new cases to the eighteen previously reported of spontaneous cure of cataract. There is always a fluidification of the peripheric portions of the lens, or a transformation of the mature cataract into a Morgagnian. Following this the masses may decrease in volume, and the serous watery capsular fluid increase until, with the predominance of the latter, the lens gradually becomes transparent. This is particularly the case when both the fluid and the solid masses are absorbed.

After reporting an unfavorable case of simple extraction with an iris prolapse that was left, NICATI (446) discusses the different modifications of the operation of extraction.

When glaucoma develops in an eye with senile cataract, SANTOS FERNANDEZ (467) advises that iridectomy be done. The extraction of the lens, in his opinion, does not influence the healing of the glaucoma. SULZER.

The chief interest in RANDOLPH's (468) series of operations lies in the fact that most of the operations were done in negro huts in the country or with other equally unfavorable conditions. In most cases an iridectomy was made. Two eyes were lost, one from hemorrhage and one from corneal suppuration.

BURNETT.

DE WECKER's (470) letter to Sbordone, who defended simple extraction at the Congress in Palermo, is directed against the upholders of iridectomy. Iridectomy should have been discarded when the peripheric linear incision was given up. The incarcerations of iris and capsule in the latter operation are, in Dr. Wecker's opinion, far more dangerous than the iris prolapses occurring with simple extraction. In order to prevent this, a section should be found which does not gape too much, nor makes the coaptation of the margins difficult, and above all permits an easy extraction of the lens.

There are three sections to choose from: 1. The usual flap, the height of which is one third the diameter of the cornea, and the apex of which lies at the corneal margin; 2. A flap the base of which lies in the horizontal diameter of the cornea and its apex 2 *mm* from the middle of the upper corneal margin; and 3. A flap with its base 2 *mm* below the horizontal diameter and its apex at the junction of the middle and upper thirds of the vertical diameter. All of these sections have their advantages and their disadvantages in respect to the points under consideration. The second is adapted for large cataracts with a hard nucleus; the third would render difficult the extraction of the lens, but also the prolapse of the iris. A great step would be the discovery of a miotic more energetic than eserin which De. Wecker still uses although many have given it up. V. MITTELSTÄDT.

KNAPP's (471) cases comprise 623 simple and 60 intercurrent combined extractions, made within six years. The principal points in the author's present procedure are the following: Preparatory operations are not done. He prefers to operate on an unripe lens than on one swollen by imbibition. The section is entirely in the cornea, everywhere in the same plane, and occupies nearly the entire upper half of the cornea; a small conjunctival flap is neither necessary nor disadvantageous. He opens the capsule at the periphery with a fine cutting cystitome which he has devised for this purpose, and he does not remove any part of the anterior capsule unless it is thickened. He does

not wash out the anterior chamber nor does he go into the eye to bring out remains of cortex. The patient is sent from the operating chair to his bed with his eyes unbandaged, and if, when examined five to thirty minutes later, the iris is found to be in position, both eyes are closed with sterilized gauze cotton and isinglass plaster. When prolapse occurs within 24 hours, it is excised; when it appears later, it is left until the eye is entirely free from irritation. The author has found excision after the first day dangerous. In almost all cases he makes an early secondary discission with a knife-needle. He had an excellent result in 257 uncomplicated cases, a good result in 227, moderate in 28, a loss in 2, and prolapse of the iris in 19. BURNETT.

LANDOLT'S (472) interesting paper presents the following points: Cataract extraction is now much less dangerous than formerly, not on account of changes in the operative methods or a more accurate knowledge of the nature of cataract, but chiefly because of antisepsis and cocaine. It cannot be said, however, that all cataracts may be operated with the same facility and by the same process, for cataracts are too different in nature. The danger of extraction has uniformly decreased for all forms. For the simple mature senile cataract they are almost nil, so that some make the operation without iridectomy, and others allow the operated patients more liberty than before. Incomplete and complicated cataracts demand a careful selection of an operative method and careful watching during their course.

V. MITTELSTÄDT.

DE WECKER (473) criticises Landolt's views in regard to simple extraction as opposed to the combined operation, and believes that even skilled operators, if they know only the latter procedure, can give no judgment for or against the operation. He himself makes iridectomy in about one third of his cases, which, however, even when the operation has been normal, cannot prevent severe complications in the course of healing.

V. MITTELSTÄDT.

In a case with normal curvature of cornea and anterior surface of lens, GÜLLSTRAND (476) found by transmitted illumination a circular surface 3 *mm* in diameter, with a central dark patch, in the pupillary field. The refraction in the central round surface was highly myopic, while the periphery of the lens showed no myopia. On examining the third Purkinje image it was a normal inverted image in the periphery, which, as it neared the centre,

suddenly became elongated and disappeared; he found also a small accessory image which, starting from the centre, moved toward the other image and met this at the moment when the latter vanished. There was therefore a transition zone, convex forward, between the central bulging and the normal peripheric portion of the posterior surface of the lens. SCHIÖTZ.

When a secondary operation is required after an extraction CHIBRET (478), seven to ten days after the extraction, opens the operation wound with a spatula in an extent of 4 *mm*, and extracts or divides the secondary cataract. SULZER.

XVIII.—RETINA AND FUNCTIONAL DISTURBANCES.

479. WIDMARK. On dazzling of the retina. *Nord. ophth. Tidschr.*, v., pt. ii., Kopenhagen, 1892. *N. Hygiea*, No. 6, Stockholm, 1892.

480. PANAS. Quinine amblyopia. *Rev. gén. de clinique*, 1892. No. 7.

481. LÈGUES. Hemophthalmia following the discharge of a cannon. *Arch. de méd. militaire*, Feb., 1892.

482. WILBRAND. A case of scotoma blindness and hemianopsia with autopsy. *Deutsche Zeitschr. f. Nervenheilk.*, ii., p. 361.

483. BURCHARDT. Amblyopia from non-use of the eyes, *Charité Annalen*, xvii., p. 474.

484. PLACZEK. Förster's displacement type, an objective symptom of traumatic neurosis. *Berl. klin. Wochenschr.*, 1892, No. 35, 36.

485. KÖNIG, W. On fatigue of the visual field and its relation to concentric contraction in diseases of the central nervous system. Leipsic, E. W. Vogel, 1892. (An exhaustive and interesting monograph, with an extensive bibliography.)

486. WADSINSKY. A case of gummous tumor of the sclera. *Wjest. Ophthal.*, 1892, No. 6.

487. HERRNHEISER. Contributions to the knowledge of metastatic inflammations of the eye and retinitis septica. *Zehender's klin. Monatsbl.*, xxx., p. 393.

488. WAGENMANN. Anatomical investigations on unilateral hemorrhagic retinitis with secondary glaucoma, also a report of the hypopyon keratitis observed with it. *Graefe's Archiv*, xxxviii., p. 213.

489. v. HIPPEL, E. A case of retinitis proliferans. *Zehender's klin. Monatsbl.*, xxx., p. 370.

490. KERN, R. On embolism of the central artery of the retina. *Inaug. Dissert.*, Zurich, 1892.

491. WEYMANN. The region of the macula lutea in ophthalmoscopy. *The Ophth. Record*, Dec., 1892.

492. GOULD, G. M. Amblyopiatries. *Med. News*, Dec. 31, 1892.

493. KINGDON. A rare fatal disease of infancy, with symmetrical changes at the macula lutea. *Trans. Ophthal. Soc. Unit. King.*, xii., p. 126.

494. PRIESTLEY SMITH. Changes in the retina due to long-continued lodgment of a metallic foreign body on its surface. *Ibid.*, xii., p. 191.

495. BEEVOR and HORSLEY. On a case of traumatic abscess in the neighborhood of the left angular gyrus, with right hemianopia (limited fields) and word blindness; treated by operation. *Ibid.*, xii., p. 204.

496. COLLINS, E. T. Intraocular neoplasm of doubtful nature and origin. *Ibid.*, xii., p. 165.

497. SPICER, W. H. Retinal vasculitis in inherited syphilis. *Ibid.*, xii., p. 116.

498. STEPHENSON, S. Unusual retinal reflex. *Ibid.*, xii., p. 115.

499. TAY, W. A fourth instance of symmetrical changes in the yellow-spot region of an infant, closely resembling those of embolism (see *Trans.*, vol. i., pl. iii.). *Ibid.*, xii., p. 125.

500. STEPHENSON, S. Angioid streaks in retina. *Ibid.*, xii., p. 140.

501. GUNN, R. M. Ophthalmoscopic evidence of (1) arterial changes, associated with chronic renal disease, and (2) of increased tension. *Ibid.*, xii., p. 124.

WIDMARK (479) reports a case of dazzling of the retina and reviews the eighteen cases reported since 1879. Usually a permanent positive scotoma appears, the visual acuity is more or less reduced, and in the macula there is in the beginning a light patch surrounded by a red or reddish-brown border, which later becomes darkly pigmented. In some cases all the symptoms disappear. The author has made experiments on animals and con-

cludes that the changes in the retina caused by exposure to intense light are to be considered an œdema with necrosis of the nervous elements, not the consequence of a coagulation of albumen (Czerny and Deutschmann), but rather the results of chemical action, particularly of the shortest waves of light.

SCHIÖTZ.

PANAS (480) reports the clinical history of a patient who became unconscious after the absorption of ten grains of sulphate of quinine, and after awaking was completely deaf and blind. Hearing returned on the following day, but the amblyopia, due to ischæmia of the retinal vessels, persisted for a long time. At the present time the patient still has hemeralopia. The author calls attention to the fact that the optic nerve when affected by quinine only regains its function slowly and incompletely, while the acoustic nerve recovers soon and completely. (The same as in many cases on record.—H. K.) SULZER.

LÈGUES (481) examined an artilleryman, who experienced a shock and felt a pain in the right eye after the discharge of a 19 *cm* gun. The blind right eye showed extensive hemorrhage into the vitreous, and loss of the phosphenes with the exception of the nasal one. SULZER.

BURCHARDT (483) reported a case of strabismus divergens with V = fingers at 12 *cm* Six days after the squint operation the vision was $\frac{3}{10}$.

PLACZEK (484), in all cases of concentric contraction of the visual field in traumatic neurosis, found the Förster displacement type well marked. (I have not.—*Reviewer.*)

WADSINSKY (486) saw a gummous tumor 1 *cm* broad at the lateral margin of the cornea, and a diffuse retinitis in the same eye. Under the use of mercurial enunctions and iodide of potassium the retinitis disappeared and the tumor was absorbed, leaving a pigmented depression. HIRSCHMANN.

HERRNHEISER (487) believes that metastatic retinitis is an inflammation of the retina, caused by micro-organisms, while retinitis septica belongs in the category with the retinal changes in certain general diseases—leucæmia, nephritis, etc.—the cause of which is a chemical change in the blood. The disease occurs not only after confinement, but also with pneumonia, peri- and endo-carditis, typhus, cerebro-spinal meningitis, purulent processes, otitis media, etc.

WAGENMANN (488) from the examination of his first case concludes that an ophthalmoscopic picture of hemorrhagic infarcts,

similar to that in which Michel found thrombosis of the central vein, may arise from multiple embolism of the retinal arteries. His second case furnishes the anatomical proof of Michel's second group of partial thrombosis of the central vein. His third case shows that a unilateral inflammation of the retinal vessels may develop, causing inflammation and hemorrhage, partly by injury to the vessel walls, partly by multiple arterial and venous thromboses without there being a thrombus of the central vein.

The case of HIPPEL (489) is noteworthy because of the absence of previous hemorrhage and on account of the peripheric location of the focus.

KERN (490) from a study of the literature and of the material in the Zurich clinic comes to the following conclusions: The majority of the cases described as embolism of the central artery are not embolisms, but probably a local disease of the central artery, such as atheroma, syphilis, endarteritis from Bright's disease or other dyscrasic conditions. When there is no organic heart lesion, syphilis should be suspected. In accordance with these views the general as well as local treatment should be employed.

WEYMANN (491) has made a careful study of the appearance of the macula and figures and describes its variations in the healthy eyes, which are five in number—ring-shaped, disc-like, oblong, crescentic, and an irregular form which is variable. The typical form he deems that with a central red dot with a circular band of whitish color. BURNETT.

GOULD (492) uses the term amblyopiatries to signify the therapeutics of amblyopia ascribed to "disuse," such as we ordinarily find in strabismus, etc.; and for the term *amblyopia ex anopsia* he uses the more correct term *argamblyopia*, and the treatment which he has instituted with marked success is: 1. Correction of the ametropia. 2. Reinstatement of muscular balance if imbalance exists. 3. Exercise. This latter consists in requiring the patient to use the amblyopic eye alone, and in the case of children paralyzing the accommodation of the better eye for weeks at a time. A number of cases are given illustrative of the method and its results. BURNETT.

KINGDON (493) records a case similar to those described by Warren Tay. On examination of the brain slight alterations in the cells of the cortical layers were all that was observed. In the retina the outer molecular layer seemed spaced out and enlarged

as if by œdema. The author briefly reviewed cases described by Goldzieher, Magnus, Knapp, and others. WERNER.

In PRIESTLEY SMITH'S (494) case a fragment of bell metal was observed in the retina for fifteen months, the media remaining clear throughout. The metal was a mixture of copper, tin, and zinc. There was a scotoma in the field extending radially outwards from the spot corresponding to the site of the metal. $V = \frac{6}{18}$. Five months later it gravitated downwards producing a new scotoma, and leaving a gray opaque patch, with peripheral pigmentation, in its previous position. Thirteen months after a peculiar lustrous deposit was noticed over the vessels near the disc. WERNER.

In BEEVOR and HORSLEY'S (495) case, which was brought forward on account of peripheral contraction of the field in the eye opposite to the lesion of the angular gyrus, the evidence was not very conclusive. WERNER.

COLLINS' (496) case was probably a peculiar form of glioma (?) WERNER.

SPICER (497) records five cases of this disease, which is frequently associated with interstitial keratitis. The smallest veins are those chiefly affected, but the arteries also present the lateral white lines, increasing, as in the veins, towards the periphery, where at times the blood column disappears. There is generally some disturbance of the choroidal and retinal pigment in some cases resembling retinitis pigmentosa. The thickening of the vessels is due chiefly to a deposit under the endothelium of the inner coat, although there is some perivascular thickening with increase of nuclei. The changes are similar to those which occur in the cerebral vessels. WERNER.

498. This consisted in angular silvery streaks concentric with the disc, like a spider's web without radial fibres.

WERNER.

STEPHENSON'S (500) patient had been a painter for three years, but never presented any toxic symptoms or signs. In both eyes dark reddish wavy anastomosing bands extended over the fundus; lying beneath the retinal vessels, there were also a few brilliant white metallic-looking spots, one large plaque and some hemorrhages. WERNER.

GUNN'S (501) patient exhibited an exceptionally bright light streak on the arteries which presented a somewhat metallic appearance; when they overlay a vein the latter was at times apparently empty and distended beyond. WERNER.

XIX.—OPTIC NERVE.

502. BOUVERET. Optic neuritis in a case of tuberculosis of the cerebral peduncles. *Rev. de médecine*, Sept., 1892.

503. DARIER. Subconjunctival injections of bichloride in certain affections of the optic nerve, neuritis, retrobulbar neuritis, amblyopia, etc. *Soc. d'opht. de Paris*, March, 1892.

504. SOMYA. A contribution to the study of hereditary retrobulbar neuritis. *Zehender's klin. Monatsbl.*, xxx., p. 256.

505. SOMYA. On partial atrophy of the optic nerve with hematemesis. *Centralbl. f. prakt. Augenheilk*, xvi., p. 225.

506. GALEZOWSKI. On the prodromal signs of tabic atrophy of the optic papillæ and on the syphilitic origin of the disease. *Rec. d'opht.*, No. 9, 1892.

507. SULZER. On a primary tubular angio-sarcoma of the optic nerve. *Graefe's Archiv*, xxxviii., 3, p. 33.

508. ROHMER. A case of lymphangiectatic fibroma of the optic nerve. *Soc. franç. d'opht.*, May 2, 1892.

509. SATTLER. On optic nerve tumors proper and their surgical treatment. *Beiträge zur Chirurgie*, 1892, Billroth Festschrift.

510. LAGRANGE. On the preservation of the eyeball in the extirpation of tumors of the optic nerve. *Cong. franç. de Chirurg*, iv., session April, 1892.

511. TAYLOR, S. J. Hereditary optic atrophy. *Trans. Ophth. Soc. Unit. Kingd.*, xii., p. 146.

512. THOMPSON, J. T. Case of Leber's hereditary optic atrophy. *Ibid.*, xii., p. 156.

513. SNELL. Two cases of double optic neuritis occurring after influenza. *Ibid.*, xii., p. 162.

514. DRAKE-BROCKMAN. A case of double optic neuritis dependent on spinal disease. *Brit. Med. Journ.*, July, 1892, p. 77.

515. KEYSER. Glioma of the optic nerve—exophthalmus—enucleation. *Annals of Ophth. and Otol.*, Oct., 1892.

516. WOOD, CASEY A. The retrobulbar neuritis of young adults. *Ophth. Rec.*, June, 1892.

517. DE SCHWEINITZ. Embolism of the central artery of the retina, with a report of three cases. *Journ. Amer. Med. Assoc.*, Sept. 24, 1892.

518. AYRES, S. C. Embolism of the central artery or thrombosis (?), with report of a case. *Ibid.*, Sept. 17, 1892.

BOUVERET (502) reports the following case. A tuberculous patient, æt. twenty-two, showed an incomplete left hemiplegia, inferior facial paralysis of the same side, and incomplete right ptosis. Paralysis or paresis of all the left ocular muscles. Beginning optic neuritis on both sides with decrease in visual acuity. Left monocular diplopia. Six months later the neuritis worse and retinal hemorrhages. Soon after complete right oculomotor paralysis, and after choreic movements complete paralysis of left, and right hemiplegia. Death in coma. At the autopsy a caseous focus was found at the foot of the left second frontal convolution, at the margin between the gray and the white substance. When the cerebral peduncles were divided, two tuberculous foci were found, each the size of a hazel-nut. One had nearly destroyed the right peduncle and extended into the lateral ventricle. It reached the floor of the aqueduct of Sylvius, the gray substance of which it had destroyed. The second focus lay in the left peduncle. SULZER.

DARIER (503) has obtained good results with subconjunctival injections of sublimate in cases of retrobulbar neuritis due to rheumatism, scarlatina, typhus, and influenza, and also in cases of central amblyopia of unknown origin. SULZER.

SOMYA (504) found neuro-retinitis in a man aged nineteen. The mother, two brothers, and two nephews had also suffered from the same affection.

GALEZOWSKI (506) finds a larger percentage of syphilitics among his cases of tabic optic atrophy than any other observer. He ascribed the uselessness of specific treatment to the fact that severe symptoms appear only at an advanced stage of the disease.

SULZER (507) reports a new case in a child, aged two and a half, and retains the name angio-sarcoma since the tumor originated in the perithelial cells of the vessels.

ROHMER (508) removed from a child aged three and a half a tumor of the optic nerve that had developed for three months. After cutting the tendon of the external rectus the nerve was cut through close to the sclera and the diseased portion separated from the healthy nerve. Recovery with slight atrophy of the retracted eyeball. The tumor was the size of a hazel-nut, and surrounded the nerve, whose nervous elements were destroyed by

pressure of a fibrous mass in the sheath and the interstitial tissue. The lymphatic system took part in the formation of the tumor, as was shown by numerous communicating lymph spaces. The tumor was benign, and after a year there had been no recurrence.
v. MITTELSTÄDT.

TAYLOR (511) records four cases, the patients being brothers. The family consisted of six sons and five daughters, the latter escaping. The personal and family history is given very fully. The ages of the patients varied from twenty-seven to fourteen years; they all smoked. In the two eldest the sight was better towards evening. WERNER.

DRAKE-BROCKMAN'S (514) patient, a boy æt. nineteen, died comatose from obscure disease of the spine opposite the third dorsal vertebra. There was double optic neuritis with brilliant metallic-like spots at macula, paralysis of right sixth nerve and ptosis, headache and vomiting and later on convulsions, spasms of the neck muscles. As there was no post-mortem allowed, meningitis of the base of the brain could not positively be excluded.
WERNER.

KEYSER'S (515) case was that of a feeble-minded girl of eight who had exophthalmus of both eyes, which had begun about four years ago. There was a papillitis in the right. The fundus of the left could not be seen because of the strong inward squint. The symptoms increasing the right eye was enucleated and the nerve found to be swollen. Some days later, paralysis on the right side set in, and she died soon after. The autopsy showed cerebral meningitis; right nerve markedly swollen, left nerve normal in orbit, but external to the chiasma there was a tumor three quarters of an inch in diameter, another small one sprang from the base near the pons and on the right side. On the left side in the substance of the middle lobe and anterior to the lateral ventricle there was a cyst $1\frac{1}{4}$ by 1 inch with a distinct wall and light amber contents. The tumors of the optic nerves were glioma or round-celled sarcoma. BURNETT.

WOOD (516) reports two cases of retrobulbar neuritis, one in a man and one in a woman. In both cases a permanent central scotoma for white and a larger scotoma for colors remained. The fundus and discs remained normal. He believes that these cases usually are cured. BURNETT.

The first case of DE SCHWEINITZ (517) is noteworthy since it was seen twenty minutes after the sudden attack of complete

blindness came on. Even at so early a stage the œdema of the retina and the cherry-red spot at the macula were present. The vessels were all narrow. On the following day they had become larger, but in the course of some weeks they assumed the usual appearance seen in such cases. No perception of light. There was a marked mitral regurgitation and a systolic murmur. The two other cases were of the usual nature. BURNETT.

AYRES' (518) case was that of a man aged thirty-three, who awoke one morning to find himself blind in the left eye. In the inferior sector he could still count fingers at two feet. The retina presented the usual picture of embolism, and there was the cherry-red spot at the macula, but the vessels were of normal calibre and the disc normal. Four days after the attack the vision was entirely restored, but the œdema of the retina and the cherry-red spot remained a week or two longer. The condition of the heart was not noted. The patient was addicted to the use of tobacco and alcohol. BURNETT.

XX.—INJURIES, FOREIGN BODIES (PARASITES).

519. FERRON. A metallic particle in the iris. *Journ. de méd. de Bordeaux*, 1892, 79, p. 133.

520. DIANOUX. Treatment of injuries of the eye. *Soc. franç. d'opht.*, May 4, 1892.

521. FORGET. Microscopic examination of a stump after exenteration of the eye.

522. KALT. Two cases of death after enucleation. *Soc. franç. d'opht.*, May 5, 1892.

523. RAMPOLDI. Anchylostomum duodenale and retinal hemorrhages. *Ann. di Ottalm.*, xxi., 4–5, p. 357.

524. DOLINA. On the pathological anatomy of intraocular cysticercus. *Beiträge zur path. Anat. und allg. Path.*, v., p. 2.

525. GRAEFE, A. On intraocular cysticercus and its operative treatment. *Report of the German Society of Naturalists and Physicians*, Halle, 1891.

526. GRAEFE, A. Extraction of two cysticerci from one eye. *Zehender's klin. Monatsbl.*, xxx., p. 297.

527. FISCHER. The first discovery of anchylostomum duodenale in German miners, and the action of the anæmia caused by the parasite, on the eye. *Report of Heidelberg Ophth. Soc.*, 1892.

528. Roy. Report of a case of foreign body in the choroid and retina with retention of good vision. *Ophth. Record*, December, 1892.

529. Collins, E. T. On the pathological examination of three eyes lost from concussion. *Trans. Ophth. Soc. Unit. King.*, xii., p. 180.

530. Collins, E. T. Report of the examination of nine eyes in which a foreign body had remained imbedded for an unusually long time. *Ophth. Review*, xi., p. 135.

Ferron's (519) patient has a piece of iron in his iris, which had flown in from an explosion and caused no trouble. Sulzer.

Dianoux (520) recommends washing out the anterior chamber with sterilized water. Extensive cauterization of the wound when there is suppuration. His statistics show that even in cases which are apparently lost satisfactory results may be obtained. Sulzer.

In Forget's (521) case the right eye was exenterated for secondary glaucoma, the sutures being put in before the hemorrhage was fully checked. The stump was enucleated nineteen months later for a neuritis in the other eye, whether sympathetic or not, being undetermined. The stump was flattened, showing numerous folds of the sclera, and measured 18 *mm* in æquatorial diameter and 10 *mm* in sagittal. The blood filling the cavity of the sclera was replaced for the most part by connective tissue in various stages of development. It is noteworthy that blood-vessels and nerves were present in the interior of the stump. The examination for micro-organisms was negative. The stump obtained by this method of operating is favorable for wearing an artificial eye at first, later it is not. v. Mittelstädt.

After a long series of successful enucleations for panophthalmitis, Kalt (522) lost two patients by meningitis. In the first case there was acute meningitis beginning with a chill twenty-four hours after the enucleation; in the second the first cerebral symptoms were observed twenty days after the enucleation. In the first case the panophthalmitis was due to an infected ulcer, in the second to traumatism. Sulzer.

Rampoldi (523), referring to Fischer's report of retinal hemorrhages in anchylostomum anæmia, calls attention to the fact that ten years ago he reported a similar case and later saw a second. In one case a convergent strabismus developed suddenly and disappeared at once after the use of antihelminthiacs. Dantone.

DOLINA (524) states that in thirteen cases examined the retina was found to be detached and the choroid in a condition partly of plastic, partly of purulent inflammation. He found in his own case of cysticercus chalky masses, giant cells and bone. The original nest lay at the point where a posterior ciliary artery pierced the sclera and ended in the choroid. The parasite had probably entered the eye by this channel.

GRAEFE (525) among a number of cysticercus operations obtained perfect vision in three. He still recommends an æquatorial section of the sclera.

ROY (528) reports a case from the clinic of Sattler in Leipsic, in which a bit of steel remained imbedded in the choroid and retina, and became incapsulated with retention of V = $\frac{6}{6}$. There was at no time any considerable reaction. BURNETT.

COLLINS (529) records three cases of injury in children, with only slight corneal abrasion. Case one had dilated pupil and iridodonesis, case two irregularity of pupil, and the iris had disappeared in the third case; in the first two the lens was cataractous and displaced upwards, and the lig. pectinatum was torn, and the ciliary muscle split in the whole of its circumference, thus deepening the anterior chamber. In the last case the lig. pectinatum was completely torn, including the fibres giving origin to the ciliary muscle, which had retracted and drawn the iris back out of sight, when viewed from the front. In all cases the lens capsule was ruptured at the equator. WERNER.

In COLLINS' (530) cases the shortest interval between the implantation of the foreign body and the enucleation of the eye was fourteen years. In seven instances the interval was more than twenty years, and in one case twenty-eight years. Enucleation was performed in three cases because the eye was blind and supposed to contain a foreign body, in five others the occurrence of pain necessitated removal, and in one case sympathetic ophthalmia occurring fifteen years after the injury. In all cases the foreign body was metallic, and situated four times in the lens, twice in the sclerotic, and twice in the vitreous, and once in a shell of bone on the choroid. The cases are tabulated.

WERNER.

XXI.—OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASE.

531. HITZIG. A contribution to brain surgery. *Berl. kl. Wochenschr.*, 1892, p. 713.

532. Bock. On artificially produced horizontal nystagmus, beginning with conjugate deviation. *Centralbl. f. Nervenheilk. und Psych.*, xv., p. 486.

533. Rendu. Nuclear ophthalmoplegia in the course of tabes. *Bullet. méd.*, Nov., 1892.

534. Christ. On nuclear ophthalmoplegia. *Deutsches Arch. f. klin. Medicin*, xlvi., parts 5 and 6.

535. Richet. Psychic blindness. *Soc. de biologie*, May 19, 1892. (Experiments on dogs.)

536. Galezowski. On alterations of the ciliary circle, and on the ophthalmoscopic examination of that region in constitutional diseases and in myopia. *Ann. d'ocul.*, cviii., p. 161.

537. Déjérine. On the localization of word blindness. *Soc. de biologie*, Feb. 27, 1892.

538. Boë. A case of rapidly increasing blindness. On the use of lactate of zinc. *Acad. de méd.*, May 3, 1892.

539. Müller, F. A contribution to the knowledge of word blindness. *Arch. f. Psychiat. u. Nervenkrank.*, xxiv., p. 856.

540. Freund, S. On optic hyperæsthesia of cerebral origin. *Centralbl. f. Neurol.*, xi., p. 530.

541. Parisotti. Comparative studies of the visual field in neuropathic and insane persons. *Boll. R. Accad. med. di Roma*, xviii., 5.

542. Ritzmann. Contributions to hypnotic suggestive therapy in ocular affections. *Correspondenzblatt für Schweitzer Aerzte*, xx., No. 3.

543. v. Hippel, E. On tumors of the hypophysis. *Virch. Archiv*, cxxvi.

544. Bidon. Hemianopsia, with hallucinations in the blind portion of the field. *Rev. de méd.*, Dec., 1891.

545. Coppez. A case of left homonymous hemiopia with complete paralysis of the left third nerve. *Soc. des sc. méd. et natur. de Bruxelles*, Oct. 3, 1891.

546. Pflüger. Bilateral temporal hemianopsia in a case of acromegaly. *Rev. génér. d'opht.*, 1892, 7, p. 295.

547. Abadie. Late manifestations of syphilis in the eye. Lack of success with general treatment. Value of local therapy. *Allg. med. Centralzeitung*, No. 65, p. 1314.

548. GALEZOWSKI. On the ophthalmoscopic examination of the ciliary circle in syphilis, tuberculosis, and gout. *Rec. d'opht.*, 1892, No. 6.

549. GRADDY, L. Report of a case of blindness as a concomitant symptom of the grippe. Permanent anomaly of the visual fields. *Ophth. Rec.*, June, 1892.

550. HERRNHEISER. Two cases of disease of the eye in icterus infectiosus. *Prager med. Wochenschr.*, 1892, No. 42.

551. GOLDSCHEIDER. A case of acute polyneuritis with implication of the optic nerves. *Charité Ann.*, xvii., p. 163. (Neuro-retinitis ending in recovery.)

552. COURTAIX. Clinical studies on the pathological relations between the eyes and the teeth. *Thèse de Paris*, 1892.

553. FERNANDEZ and MADAN. The hematozoa of Laveran in ophthalmic neuralgia. *Arch. d'opht.*, xii., 5, p. 266.

554. JULER. Persistent retinal hemorrhages in a case of diabetes. *Trans. Ophth. Soc. Unit. Kingd.*, xii., p. 137.

555. ALT. Some remarks on post-typhoid eye affections. *Amer. Jour. of Ophth.*, Nov., 1892.

556. CONNOR, LAERTUS. Heterophoria as a cause of acute rhinitis, loss of smell, and tinnitus. *Jour. Amer. Med. Assoc.*, Sept. 10, 1892.

HITZIG (531) reported two cases of circumscribed cerebral sarcoma with choked disc and concentric contraction of the visual fields, which were cured by extirpation of the tumor. At least the patients were alive seven months after the operation.

BOCK (532) saw in patients and in colleagues after turning on the vertical axis, a nystagmus with occasionally also conjugate deviation of the eyes. When the individuals were turned to the right the first nystagmic movements were to the left, and *vice versa*, while the conjugate deviation corresponded to the direction of the turning.

RENDU (533) observed a bilateral chronic ophthalmoplegia externa, after which lancinating pain came on with a girdle feeling and vesical symptoms, and two years later the beginning of ataxy.

In CHRIST'S (534) case a gliosarcoma of the pineal gland, the region of the corpora quadrigemina, and the posterior surroundings of the 3d ventricle, with hydrocephalus internus, caused a bilateral paresis of the 4th nerve by compressing the velum med.

ant. The disease began gradually with ptosis and accommodative disturbances, and developed into a complete ophthalmoplegia.

Repeated ophthalmoscopic examination of the ciliary region has shown GALEZOWSKI (536) that in various general diseases this region alone exhibits characteristic choroidal changes.

SULZER.

DÉJÉRINE'S (537) patient found in 1887 that he did not understand what he read. There was complete word blindness with right homonymous hemianopsia. The patient, a good musician, was unable to read music. Spontaneous writing and writing from dictation were normal, while copying was difficult. When the copy was removed the patient was unable to complete the word begun. Numbers were read easily, and reckoning, mental and written, was normal. Word deafness and disturbance of speech, hemiplegia, and hemianæsthesia were completely wanting. This condition lasted four years, in which time the patient learned the entire score of Sigurd and Ascanio by ear, and solved complicated problems, without being able to read the name of a single street in his walks. Sudden death after a short period of paraphasia and complete agraphia. *Autopsy:* Left hemisphere.—Fresh focus of softening in the inferior parietal lobe and the angular gyrus. The old lesions were found at the apex of the occipital lobe, at the base of the cuneus, the lobulus lingualis, and the lobulus pisiformis. All these points were atrophic, yellow, and hard, and Gratiolet's optic radiation appeared in Flechsig's section very atrophic. These lesions explained the hemianopsia, while to explain the word blindness we must assume an interruption of the association fibres between the memory centre for visual impressions of both hemispheres with the angular gyrus.

SULZER.

BOË (538) saw one eye become blind in a short time without any accompanying symptoms or any abnormal ophthalmoscopic appearance, while the vision of the other eye diminished to $\frac{1}{10}$. The second eye showed for some days a temporal hemianopsia. From the moment that lactate of zinc was given the loss of sight ceased to be progressive. Alb. v. Graefe reported an identical case in vol. iii., *Klin. Monatsbl.* SULZER.

MÜLLER'S (539) patient, aged fifty, had choked disc, severe headache, sight hemianopsia, twitching, and later paresis of the right half of the face and the right extremities. The autopsy showed

a total right trigeminus paralysis caused by the compression and degeneration of the right ganglion of Gasser and of the trigeminus by extradural tumor masses. The entire left occipital lobe was destroyed by a tumor (Psammoma tuberosum). Besides this the posterior portion of the corpus callosum was softened and thus the association fibres interrupted which connect the right occipital region with the left and with the speech centre.

FREUND (540) in a case of traumatic neurosis found a hitherto unnoticed anomaly of the visual field consisting in a marked widening of the field for white and for colors. Green extended almost to the usual limit of the field for white.

PARISOTTI (541) examined the eyes of eighty-one patients with nervous or mental diseases, giving particular attention to the visual field. These observations are of importance because they do not agree with those made by Ottolenghi in Lombroso's clinic. Ottolenghi found that the visual field of epileptics, born criminals, and prostitutes showed a specific form with re-entrant angles outward and inward and particularly upward, a form not found in patients with other nervous or mental diseases. Parisotti found re-entrant angles in sixty-three of his cases, and also the form of field described in the diseases mentioned by Ottolenghi, but also in other nervous and mental diseases. The notched form of the field and the sinuous scotomata vary from time to time, since they depend on a periodic anæsthesia of the retina caused by circulatory disturbances. DANTONE.

RITZMANN (542) saw Prof. Forel cure an obstinate blepharospasm by repeated hypnosis, and an anæsthesia of the retina in two sittings.

BIDON (544) saw a patient, æt. fifty nine, suddenly attacked by vomiting and disturbance of speech. At the same time a left hemianopsia appeared with hallucinations in the blind half of the field. The hallucinations and the other symptoms disappeared, but the hemianopsia remained permanent.

ABADIE (547) recommends subconjunctival injections of sublimate (1 drop of a 0.1 % solution daily) as the best treatment for parenchymatous keratitis, and specific disseminate choroiditis.

GALEZOWSKI (548) uses a prism with the ophthalmoscope in order to make the peripheric portion of the fundus visible.

SULZER.

In GRADDY'S (549) patient, a woman in the third week of an attack of grippe, a sudden blindness came on, which varied from

time to time, and finally ended in a left hemianopsia. The papillæ were not changed in appearance. The blindness doubtless depended upon an extra-cranial affection. BURNETT.

SANTOS FERNANDEZ and MADAN (553), making observations in malarial regions, found ciliary neuralgia to be of form of malarial attack. The typical form, without fever or other symptoms, is not so frequent as supposed. The examination of the blood according to Laveran's method confirms the diagnosis.

ALT (555) does not believe that the corneal abscesses seen in patients convalescent from typhoid fever are due to the specific poison of the fever, but to the generally reduced vitality of the patient. In one case of typhus which he saw there was an orbital abscess. BURNETT.

CONNOR (556) reported a case of exophoria of 12° which caused a rhinitis, anosmia, tinnitus, and symptoms of general nervous disturbance. The symptoms could not be referred to any other cause, and all vanished completely after the exophoria was corrected with prisms (!). BURNETT.

MISCELLANEOUS NOTES.

BOOK REVIEW.

Klinische und anatomische Beiträge zur Pathologie des Gehirns. Part II., pp. 217–448, large folio, with twenty plates and six charts. By S. E. HENSCHEN, Prof. of Clinical Medicine, University of Upsala. Upsala, 1892.

The second part of these valuable contributions to cerebral pathology is of particular interest to the ophthalmologist, since by a critical analysis of the literature and by the detailed report of the clinical and pathological examination of many cases of his own, the author seeks to establish the course of the visual tract from the retina to the cortical centre.

In the first chapters, devoted to the optic nerve, tract, and chiasm, he compares the cases of partial atrophy that have been examined microscopically, and gives a scheme of the course of the crossed, direct, and macular bundles, which differs from previous ones particularly in the arrangement of the bundles in the tract.

The greater and more important portion of the work, under the general caption, "Where does the visual centre lie?" treats of the cerebral portion of the visual tract. The course of the visual tract has been studied in two ways, first directly, in locating the lesions that have been followed by hemianopsia, and, second, by exclusion, in finding what portions of the brain in the neighborhood of the supposed visual tract have been affected without a resulting hemianopsia.

His conclusions are briefly as follows: The function of the subcortical ganglia,—external corpora geniculata, pulvinar, and the colliculus anterior of the corpora quadrigemina—are still in doubt, the cases examined so far not permitting a conclusion as to which of these ganglia are concerned in vision.

The cortex of the parietal lobe does not form a part of the visual centre. Cortical or subcortical lesions do not cause hemianopsia unless they lie deep and encroach upon the optic radiation. The visual tract includes but a small part of the optic radiation, and in a frontal section 6 or 7 *cm* from the tip of the occipital lobule the visual tract runs as a close bundle not more than 4 *mm* high, at the level of the second temporal convolution, the upper fibres supplying the upper portion of the retina.

Nor does the visual centre lie in the lateral or in the ventral cortex of the occipital lobe, since superficial lesions have been found involving each of these surfaces without causing hemianopsia. Lesions of the medial cortex of the occipital lobe have been found, however, both with and without hemianopsia. In all the cases with hemianopsia the calcarine fissure has been involved. In all the cases without hemianopsia the calcarine fissure has not been affected. The location of the lesion in all these cases is graphically represented on charts. In a most convincing case of the author where practically the only cerebral symptom was a complete hemianopsia, he found a softening involving only the cortex of the calcarine fissure and extending but a few millimetres out into the cuneus and into the lingual lobule. The visual centre then lies in the cortex of the calcarine fissure, which the author finds to differ histologically from that of other portions of the occipital lobe. We do not yet know, however, the exact extent of the visual centre or its organization, *i. e.*, what portions of it are in relation with particular portions of the retina.

The book will well repay careful study.

W. A. H.

APPOINTMENT.

Dr. L. WEBSTER FOX has been elected Professor of Ophthalmology in the Medico-Chirurgical College of Philadelphia.

PRIZE ESSAY.

The biennial Cartwright Prize of $500, established by the Alumni Association of the Medical Department of Columbia College, New York, and open to universal competition, has been awarded to Dr. Ward A. Holden, for original investigations on "The Development of the Eye."

Fig. 1.

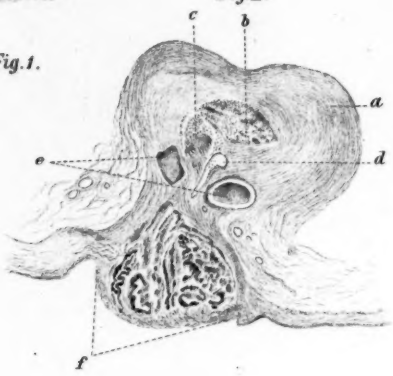


Fig. 2.

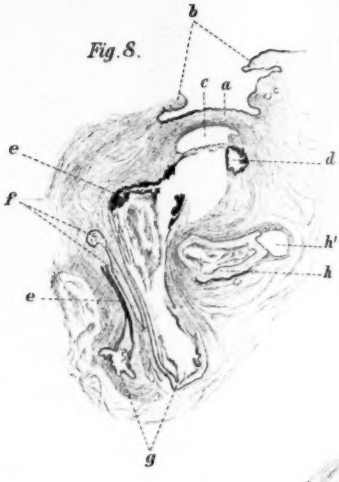


Fig. 8.

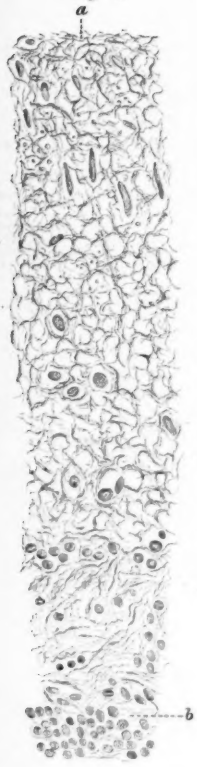


Fig. 4.

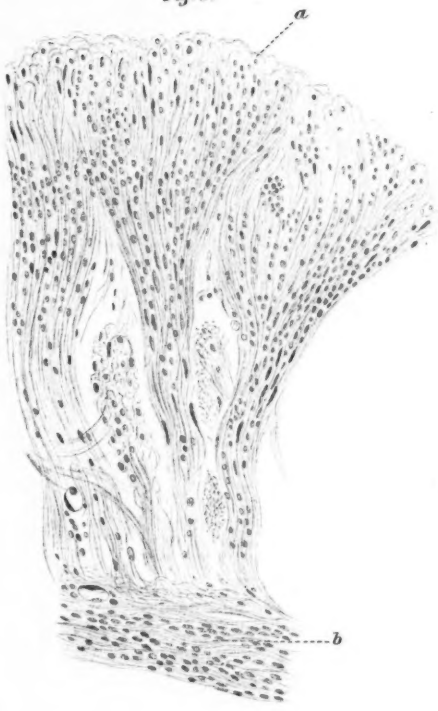


Fig. 5.

Fig. 6.

C. Kraepf, München, lith.

Jos. Rejsek

Fig. 7.

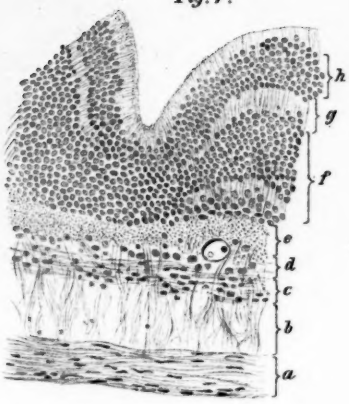


Fig. 9.

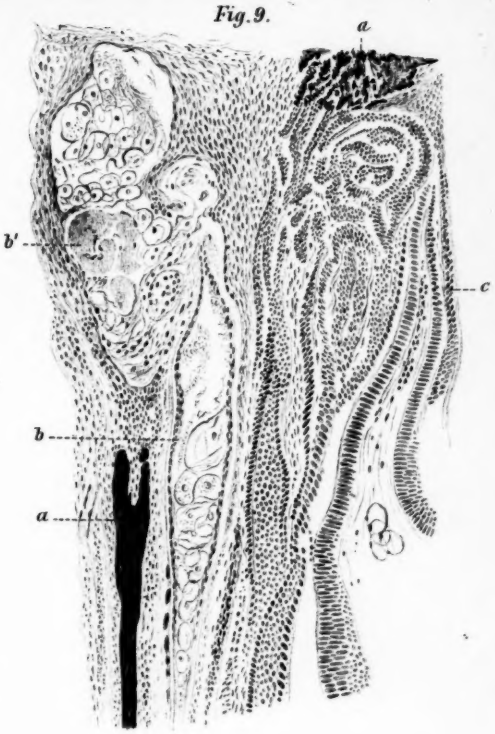
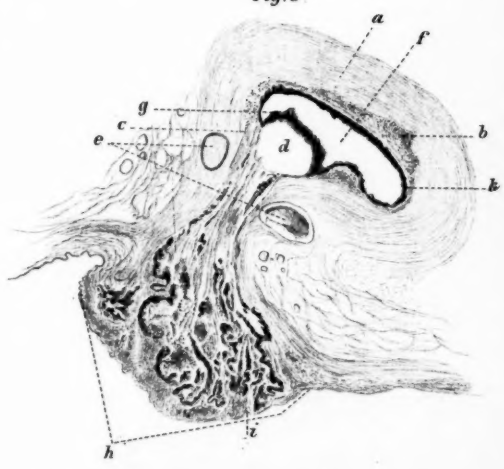


Fig. 3



Jos. Rejsek ad nat. fec.

Verlag v. J. F. Bergmann, Wiesbaden.